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BULLETIN OF THE
TAYLOR SOCIETY

A SOCIETY TO PROMOTE THE SCIENCE AND THE
ART OF ADMINISTRATION AND OF MANAGEMENT

PART I
OF
PROCEEDINGS
OF THE
MEETING OF THE TAYLOR SOCIETY

HELD AT
ROCHESTER, N. Y.

MAY 6, 7 and 8, 1920

Engineering Societies Building
29 W. Thirty-Ninth St.
New York



JUNE, 1920

VOL. V, No. 3

TAYLOR SOCIETY

ENGINEERING SOCIETIES BUILDING

29 WEST THIRTY-NINTH ST., NEW YORK

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OBJECTS OF THE SOCIETY

(Extract from the Constitution)

The objects of this Society are, through research, discussion, publication and other appropriate means:

1. To secure an understanding and intelligent direction of the principles governing organized effort for the accomplishment of industrial and other social purposes for the mutual benefit of
 - A. The Community
 - B. Labor
 - C. The Manager
 - D. The Employer
2. To secure the gradual elimination of unnecessary effort and of unduly burdensome toil in the accomplishment of the work of the world.
3. To promote the scientific study and teaching of the principles governing organized effort, and of the mechanisms of their adaptation and application under varying and changing conditions.
4. To promote general recognition of the fact that the evaluation and application of these principles and mechanisms are the mutual concern of the community, labor, the manager and the employer.
5. To inspire in labor, manager and employer a constant adherence to the highest ethical conception of their individual and collective social responsibility.

(Continued on inside back cover)

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29 WEST THIRTY-NINTH STREET, NEW YORK

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JUNE, 1920

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COMMENT

THE Rochester meeting was in many ways the most successful which the Society has held. The help in planning and preparation which was received from the local members was a one hundred per cent performance, and the cordial cooperation of the Rochester Chamber of Commerce stands as positive proof to the members of the Taylor Society that the reputation of the Rochester Chamber for knowing how to do things well and doing them well is not an accident.

AND apparently the Chamber of Commerce is an institutional symbol of a community in which individual firms and individual executives know how to do the right thing well. The invitation to participants in the meeting to visit the plant of Art in Buttons, Inc., was wholly voluntary, and the arrangements at the plant to receive visitors made the visit one of the most interesting sessions of the meeting.

Following an agreeable luncheon in the clean and inviting lunch room of the plant, and an instructive talk by Mr. Henry T. Noyes, General Manager, concerning the manufacture of buttons, the guests were conducted in groups through the plant, where they observed the processes of manufacturing buttons from vegetable ivory as developed in accordance with the methods of scientific management. And each brought from the plant as a souvenir of a most interesting afternoon, a little box containing specimens showing the processes of manufacture from the raw material to the finished button.

BY some happy accident the program of the meeting was so arranged that it proceeded from one session to another with a cumulative interest and force which is the goal, not always achieved, of program makers. There was no anti-climax. The technical papers of the first and second sessions merged into more general (but not less vital) papers of the later sessions, and the address of President Hopkins which closed the meeting was a masterly presentation of argument blended with inspiration. The simultaneous informal round table conferences of Saturday afternoon were well attended and were the most fruitful in result of any similar informal technical conferences which the Society has offered. The program was so varied that everyone who attended seemed to be able to get something of what he went after.

THE statistics of attendance, drawn from the registration, present facts both satisfactory and unsatisfactory. There were 286 registered. It should be noted, however, that estimating from the known seating capacity of the rooms in which the meetings were held, there were present at the large sessions some 125 additional persons who had not registered. Most of these were undoubtedly non-member residents of Rochester who dropped in to the sessions which interested them particularly. The registered attendance was as follows:

Members	55
Non-Members	
Residents of Rochester	138
Non-Residents of Rochester	94 232
	— —
Total	286

The only group which made a record for attendance was the group of participants who were not members of the Society and not residents of Rochester.

CARL GEORGE LANGE BARTH

ELECTED HONORARY MEMBER OF THE
TAYLOR SOCIETY, MAY 8, 1920

AT the session of Saturday evening, May 8, Henry S. Dennison, President of the Taylor Society, arose and made an announcement wholly unexpected by the recipient of the honor which it conferred:

"A provision of the constitution of the Taylor Society gives the Board of Directors authority to elect to honorary membership by unanimous vote. The Society guards this class of membership jealously. In the ten years of its history there have been but two Honorary Members—Frederick W. Taylor, and M. Henri Le Chatelier, inspired director of the development of scientific management in France.

"Tonight the Board of Directors announces another election to honorary membership.

"Not because of his skill as a consulting engineer, for he is not alone in that competence; not because of his unexcelled mastery of the technique of scientific management, for others share with him such distinction; not because of his unique and lovable personality, for others are lovable and some even uniquely so; not because of the rugged integrity of his character, conspicuous though that be; but because of all of these in combination, and especially because of his application of pure science to the uses of management, do we thus honor ourselves and him.

"As assistant to Mr. Taylor some twenty years ago, he brought to Mr. Taylor's genius as a scientist in management the aid of his own genius in pure mathematics; to the data of which Mr. Taylor's vision inspired the acquisition, he applied the laws of mathematical logic and compelled a chaos of figures to yield its secret; then with that absolute and therefore practical command of his science, he devised the mechanism of a slide rule which put into its simplest form the answer which chaos had been compelled to give, making it available to the clerk in the planning room and to the foreman in the shop.

"The Board of Directors announces that Carl George Lange Barth is an Honorary Member of the Taylor Society."

Those readers who are not acquainted with the origin and development of scientific management, and are interested in more specific information concerning the scientific contributions of Mr. Barth, are referred to Taylor's "On the Art of Cutting Metals" and to Mr. Barth's articles "Supplement to Frederick

W. Taylor's 'On the Art of Cutting Metals,'" now appearing in current issues of *Industrial Management*.

A DENNISONIAN PROPOSITION

I WANT to propose to the members of the Taylor Society an application of the principles of scientific management to the whole field of corporate structure. I do not pretend that the management profession has reached such a point of perfection that it can afford a serious distraction of attention, but I do believe that steady progress in the handling of his problems brings the manager before long face to face with some fundamental difficulties inherent in the structure of the corporation he is working for. I venture to say there are few of our senior members who have not at one time or another found valuable assistance in the backing of owners who knew something of their business and whose purposes were somewhat broader than merely to obtain this year's profits; or who have not met with discouraging obstacles in the attitude of absentee owners whose eyes were focused on the stock market.

Certainly in the broad field of industrial relations the testimony of Mr. F. C. Hood, President of Associated Industries of Massachusetts, in his report of October 24, 1919, is fairly conclusive. In that report Mr. Hood said that he estimated that eighty per cent of the cases which came before the National War Labor Board, of which he was a member, came from those concerns where the general management was not at the place of operation; that is, absentee management.

For better or worse, then, I should like to make the roughest sort of preliminary analysis of the major interests at stake in the modern corporation. I shall then take the liberty of reporting upon what steps we have so far taken in our own corporation with the idea of meeting these interests and harnessing them all more or less effectively into the service of production.

It seems to me that no industrial system can hope to persist whose primary purpose is not production and efficient distribution and which does not use to this end all the necessary factors. I take as the four chief factors Capital, Management, Labor and the Customer. Their purposes in the industrial structure are too well known to dwell upon; their necessary rewards will however bear close analysis.

CAPITAL

1. In the first place it is necessary to make a payment to capital for its use, a payment sufficient at any given state of the market to induce the investment of savings rather than their expenditure. This rate is approximately the savings bank or government security rate.

2. There must be for industrial purposes a payment made in addition to the above to cover the normal risks of industry. The rate required to cover use and normal risk is fairly well illustrated at any time by the rate at which good industrial preferred stocks are selling.

3. Capital at normal risk is likely to require some provisions in the nature of insurance, such as a sinking fund for its gradual retirement or a liberal depreciation policy. A common provision for the insurance of capital at normal risk is to grant to such capital powers of control in case the agreed payments of interest and dividend cannot be kept up.

4. In addition to these conditions there is in practically every business—certainly in its early years—a special risk. The necessary payment for this special risk must of course be determined in each case separately and must be determined by the bargaining process. Special risks may warrant an agreement to pay, if earned, large rates of dividend on common or preferred stocks, but there are few special risks for which some definite maximum agreement cannot be made.

5. To obtain capital in the first two categories it is seldom necessary to grant it voting privileges; for bonds and preferred stocks voting powers usually develop only upon breach of contract. For capital at special risk, voting privileges are more appropriate, but it is not by any means always necessary to make such a bargain for capital that voting privileges continue after the special risk stage is passed. It is after this stage is passed that the voting powers become inappropriate and liable to cause difficulties.

6. Capital is in one respect vitally different from the other three factors. When once purchased its service to the corporation cannot be materially affected by variation in reward. Bonuses to capital may have a part in inviting new capital into the business but cannot obtain added service from the old. In this respect capital once obtained resembles more closely the facilities of a business—raw materials, buildings, machineries, etc.—than the live human factors of management, labor and the trade.

MANAGEMENT

1. The corporation must pay for the use of management with salaries.

2. It is probable that normal risk enters as a very real consideration in obtaining management; that is to say, it could probably be shown that the average salary for ultra safe positions,—government jobs, saving bank jobs, and the like,—is lower than salaries for similar positions in business houses where the chances of loss of job are greater.

3. The only consideration which might be taken to resemble insurance lies in the expectation of those taking managerial positions that they will be paid through good times and bad and given a reasonable allowance of time for sickness.

4. Payment for more than normal risk is only rarely made by higher salaries. The dynamic force of a reward varying with the success or non-success of the venture is a more common and effective means of payment. Besides the provision of reward for success there can very effectively be provided a penalty for failure. This is very simply arranged where the management and the owner of capital are one and the same; or can be provided by giving the members of the management shares of common stock at the time of incorporation, or from year to year afterwards as a share in profits.

5. Control is by definition the natural function of management. Its daily specific control obviously must be in close concord with other general or partial controls whether exercised by stockholders' representatives, labor unions, or government.

6. With management the dynamic force of the bonus is of primary importance. Management stands at the center of all the forces of the corporation performing the functions of inspiring and coordinating their activities. Any reward to management which might link its destiny intimately with that of the corporation should therefore lend strength to the whole structure.

LABOR

1. The payment for the use of labor is the basic wage.

2. Normal risk may enter as a consideration, but labor at anything less than normal risk is so scarce that its consideration is of academic interest only.

3. Labor has not until recently been in a position strong enough to raise the question of insurance. We have started with accident compensation and obviously must soon set about the working out of the prob-

lems of insurance against irregular employment. Even if the bargaining power of labor has not heretofore been great enough to insist upon these insurance provisions, it is reasonable to suppose that they are of an interest and value to labor as similar to the interest and value to capital and management.

4. Special risk payment for labor is for our purposes an inconsiderable matter.

5. Control, with labor, is not a function of the risk of the business but of an entirely different variable. Labor has shown itself for the most part free from any desire to control or to have part in the control of the general affairs of the corporation. It selects from among the corporation's activities wages, hours and such working conditions as most immediately concern labor, and is more and more insistent in demanding a voice in the control of just these matters.

6. The dynamic value of varying rewards to labor is generally recognized and met in the payment of piece rates or performance bonuses. It is becoming clear, however, that while labor is not so intimately tied into the corporation that its reflex effects are as vital as those of management, nevertheless its connection is more vital than has been our habit of thinking and its collective will, therefore, of greater concern. It will probably pay, therefore, other things being equal, to enlist the collective interest and goodwill of the worker by appropriate means.

THE CUSTOMER

1. The use of the customer's service whether as distributor or consumer must be paid for by affording some value to him greater than any payment he must make for the corporation's goods, or incidental to their use or resale.

2. Normal risk may be presumed to reside in such goods as branded lines as against the great staples such as cotton, wheat, copper and the like. To handle these lines a slightly greater margin would be expected by the retailer or somewhat more careful purchasing effort exerted by the consumer.

3. Insurance against loss to the customer is to be thought of only in connection with special risks and then takes some form similar to sale by consignment.

4. Special risks are not generally assumed by a customer. The corporation itself must usually stand behind the success of new ventures until the quality of sample lots is pretty thoroughly determined or resale goods introduced soundly into the market. Com-

mon instances of customer's special risk are seasonal and fashionable goods. On such goods the dealer demands a larger margin of gross profit.

5. In the normal market the equal bargaining power of the customer usually provides a sufficient share of control. As in the case of labor it is not related to risk but rather to that class of the corporation's activities which interest and affect the customer; the customer desires and in the normal market achieves a voice in control of styles, prices and deliveries in much the same degree and sense in which labor would achieve such a voice if the bargaining power had been in the past more nearly equal to that of the employer.

6. Rewards for the customer varying with performance are ordinarily provided by the customer's own activities. There are, however, a few instances of special bonuses for quantity of purchases and devices for a share in profits which have been instituted as attempts to gain the dynamic values of the customer's active cooperation. Along some such lines must forces and factors be analysed when scientific rather than exclusively legal attention comes to be given the problem of building or re-building the structure of a corporation. Present practice applies the dynamic forces of gain and loss chiefly to that factor which has least power of direct response, necessitating the provision of a somewhat artificial power of response through election of the normal controlling factor. The personification of capital arose naturally enough when capitalist and manager were more frequently one and its superior powers were normal to its great scarcity in the early part of the XIX century. A permanency beyond the days of special fitness of these attributes resulted from the legal invention of the business corporation as a fund of money or values in substitution for the older partnership or group of men.

STEPS TAKEN

The Dennison re-incorporation in 1911 really forms a combination of partnership and corporation by crediting to capital in the hands of members of the management quite different responsibilities and rewards from capital of outside hands, and by assigning ownership of the annual increment, or reinvested surplus, to management rather than to capital. Its present structure may be described in conformity with the method of analysis here suggested, as follows:

Capital: 1 and 2. It was possible to pay a fixed lease for the capital which has been invested and re-

invested up to 1911. The rate was 8 per cent on an amount which included \$1,000,000 valuation for goodwill, or about 10 per cent on value of real and personal property.

3. The insurance provisions include preference in assets and dividends and control in case dividend payments are seriously delayed.

4. A rather mild special risk was met by giving control to capital until additional tangible net assets to the amount of the goodwill account had been accumulated.

5. Capital's control is a function of risk; it has no voting powers under normal risk conditions.

6. No fluctuating payments are made to capital under normal conditions; new capital may be purchased under such terms as the market may make necessary.

Management: 1, 2 and 3. Monthly salaries and informal understandings as to regularity of employment cover use, risk and surety.

4. By the distribution to members of the managerial force of the equity in each year's re-invested earnings and through capital's preferential treatment the management becomes joint owner of that portion of the capital which is always subject to special risk and where dividends fluctuate with earnings.

5. Under normal conditions and as long as it is successful, management has sole control, exercised by the usual method of stockholders' election of directors. The voting rights of this stock cease as soon as its holder severs connection with the managerial group.

6. The dynamic powers of management are referred by the full force of the profit and loss account and in each individual case by the chances for advancement in salary and position as well.

Labor: 1, 2 and 4. The "going rates" of wages form the bases for payments for use and normal risk.

3. Power of appeal to an Employees' Committee in case of discharge, the accident compensation law, a fund for relief of unemployment, and an informal pension plan all classify as labor insurance provision.

5. Through their various unions, but chiefly through the Works Committee plan, labor has just about the field of control and in just about the degree it desires and can handle effectively.

6. Payment by results is a most important spur to the dynamic powers of labor, but is by no means the only one relied upon. A considerable number of plans and policies focus upon the development of in-

ternal goodwill, among which is the recently installed extension of the industrial partnership to labor in a form of service bonus.

Customer: Relations with the customer are of the usual types based upon equal bargaining power and mutual goodwill.

HENRY S. DENNISON¹

SHOP COMMITTEES AND TRADE UNIONS

IN an instructive account of the shop committee in the Lynn, Mass., plant of the General Electric Company, published in the *New York Evening Post* of May 5th, the relation of this committee to the national trade unions is described in some detail. Ninety per cent of the ten thousand employees of the works, it is pointed out, are regular dues-paying members of trade unions. Of the employees' representatives nearly one hundred per cent are trade unionists, and the top committee of the system is entirely constituted by trade unionists. Moreover, these representatives are at the same time officials of the Lynn Metal Trades Council, which is a central union or "assembly" of delegates of certain craft unions. The company deals with these men, however, not as officials of the trade union body but as representatives of its own employees. Such is the situation described, which suggests a comparison that should prove extremely interesting. That the comparison is with British conditions need not make it less so.

The comparison is with what, for the present, is the result of the shop steward movement in Great Britain, of which we have had some accounts in this country, including some which are palpably misinforming. Where these accounts are misinforming, they are at fault—except where they are intentionally misleading—because they render their picture mainly on the basis of the early stages of the shop stewards' movement and very largely neglect the shop steward system established or in process of establishment.

The events which led from an inspiring movement to a more or less achieved establishment took place at Coventry, England. Coventry has long been a center for the manufacture of bicycles and during the war became one of the chief centers for the production of aircraft. It was a strike of some 50,000 aircraft workers, turning upon this very question of the place and function of the shop stewards,

¹Dennison Manufacturing Co., Framingham, Mass., President of Taylor Society.

which became the occasion and stimulus for the development of the *established* shop steward system.

The underlying dispute in Coventry was a mere trifle, comparatively, arising out of the interpretation and application of an award which had been handed down by one of the Government's labor committees. The employers agreed to treat with their employees, collectively. Thereupon the workers sent their shop stewards; but the employers refused to meet them. Many of these shop stewards, in Coventry as elsewhere, had their regular place in the regular trade unions and carried shop stewards' cards. But owing to circumstances created by the war, their number in Coventry, as elsewhere, had grown very greatly; there were 1,500 when the 55,000 workers went out on strike.

The employers of Coventry based their refusal to treat with their employees through the shop stewards on the plea that they had agreements to deal with the district officials of the various craft and labor unions. The workers insisted upon representation by the shop stewards and, when the employers persisted in their refusal to recognize this new type of negotiators, walked out, late in November, 1917.

Now, the point of likeness between the situation in Coventry as here described and the situation in Lynn, Mass., is that, so far as effective functioning was concerned, the district officials of the British trade unions had practically been eliminated from the scene, since they were tied hand and foot by the famous Treasury Agreement stipulating abrogation, for the duration of the war, of trade union rules, customs and practices. The Coventry companies would, therefore, have dealt merely with representatives of their own employees if they had from the outset acceded to the demand that they meet the shop stewards. In Coventry, in other words, the effect of the Treasury Agreement produced what in Lynn is the result of the determination of the General Electric Company not to deal with the trade unions. Again, as in the case of the employees' representatives in the General Electric Company's works, the shop stewards in Coventry were trade unionists, though, at the time of the strike, not all of them may have held official shop stewards' cards.

During the negotiations which supervened after a few days' duration of the strike, between the employers' association, the officials of the national trade unions parties in interest, and the shop stewards'

delegates, a situation developed which, again, is very instructive. The employers presented no objections to dealing with shop stewards as such and pleaded only that the issue of the place and function of this new type of workers' representatives had been forced by the Coventry workers before the convening of the Central Conference, set for December 8, 1917, at which the question was to come up for discussion and settlement. The Coventry Engineering Joint Committee—which would correspond, roughly, to the Metal Trades Council of Lynn—proposed “that the Coventry Engineering Joint Committee shall be the Executive Committee over all Shop Stewards and Works Committees affiliated.” The officials of the national trade unions, very naturally, opposed this enlargement of the powers and prerogatives of the Coventry central body and the resultant loosening of contact between the shop stewards and the national trade unions of their own several crafts. In this position the national trade unions had the support of the organized employers, with the result that the Shop Stewards' Agreement of December 20, 1917, embodies their program. For paragraph 5 of this Agreement stipulates that—

Shop Stewards shall be subject to the control of the Trade Unions, and shall act in accordance with the rules and regulations of the Trade Unions and agreements with the employers so far as these affect the relation between employers and workpeople.

When, after the war, at a Central Conference convened at York early in January, 1919, the question of the shop stewards came up again, this time in connection with that of works committees, the organized employers, in another clause of the Agreement then in effect, took a position which seems to signify a change of front. The war being over, and the restoration of trade union conditions covered by a solemn pledge on the part of Parliament, the trade union officials were bound to regain much of their former strength and influence. The employers—shall we say *therefore*?—turned their favor to the shop stewards. What they proposed would, in effect and without question, have taken away from the national trade unions a part in the settlement of local disputes which they had long exercised.

The clause proposed by the employers' representatives at the Central Conference at York had, indeed, been embodied in the Agreement of December 20, 1917, and read:

In the event of a question arising which affects more than one branch of trade, or more than one department of the works, the negotiations thereon shall be conducted by the management with the Shop Stewards concerned. (Paragraph 9, clause 1, of the Argeement).

Now, the trade unions objected that the effect of the clause would be to abolish the right of trade union officials to enter the shops and discuss with the shop stewards grievances that might come up. Moreover, they felt that unless trade union officials were present at the negotiations defined in the above clause, some agreement might be arrived at which would affect not only one section, but the whole trade, leading possibly to a good deal of dissatisfaction. The York Central Conference adjourned without having accomplished the purpose for which it had been called, one cause of its inconclusiveness lying in the absence, or rather non-attendance, of representatives of the Amalgamated Society of Engineers, the strongest union in the metal trades.

By early summer of the same year, however, the ever potent and admirable British common sense had prevailed and the difference was neatly compromised. By the agreement reached, the shop stewards received a recognized place and function, the works committee in the metal trades shops being placed under their direct control, while, at the same time, the entire shop organization was linked up with that of the national trade unions. The controversy which had arisen at the York Central Conference was compromised by the provision that trade union officials should be present at negotiations over questions which affect more than one trade, with the understanding that a district representative of the employers' organization should also be present. Further to safeguard the inviolability of national agreements and arrangements, it was agreed that shop stewards and works committees should make no agreements to stand as valid which in any way conflicted with national agreements and arrangements for the settlement of disputes.

Without pressing too far the comparison between the Coventry situation, and what developed out of it, with the situation in Lynn, Mass., one may, I think, fairly venture the assertion that a closer relationship—and a recognized relationship—between the shop committee of the General Electric Company and the Metal Trades of Lynn is bound to develop in time, precisely as it happened in Coventry. The relation which now exists in Lynn is analagous to what in many engineering shops in England is known as "mutuality." Where this is practiced, an individual machinist bargains with his employer concerning the piece-price to be paid for a given job that cannot be brought under the rules of the accepted log of piece-prices; but there is a tacit understanding between employer and worker, and among the workers taken together, that no bargain will be entered into that will not meet the approval of the entire working force of the shop and, beyond that, of the entire craft. In this way the standards of the trade are safeguarded. Such "mutuality" will, of course, work satisfactorily only in "organized" shops, such as the General Electric Company works at Lynn. If any such pointing out be necessary, it need only be remarked that in Lynn it is not individual craftsmen but entire groups of craftsmen or workers, acting through their representatives, which act in conformity with workers' interests wider than the shop or works in which they are employed.

May not the solution of the conflicting principles of the "closed" and the "open" shop—which upon another occasion the writer has defined as being in one of its aspects merely a phase of a deeper issue, of the conflict, namely, between the principle of representativeness and the principle of competence—lie in the direction which the more experienced British employers and workers have indicated?

THEODORE M. AVÉ LALLEMANT¹

¹World Research, Inc., New York.

ADMINISTRATION IN ROCHESTER¹

By

HENRY T. NOYES²

I AM sure we all agree that good management consists in the proper coordination of our resources and our human efforts to the best accomplishment of results. We are dealing with that problem constantly in connection with different plants and industries. I have been requested to tell you a bit, if I can, of what we have done in Rochester during the last fifteen or twenty years along the same line, but aiming to coordinate the community efforts and resources to the accomplishment of the best good for the community and for all concerned.

Perhaps I can tell you the story best if you will let me say just a little about Rochester and some of its advantages which have helped us to accomplish the most. Rochester is strictly a manufacturing city. We have little if any commerce. We have very little wholesale trade. Our interests, therefore, are to a remarkable extent common interests, centering around manufacturing.

It is a city of some 300,000 in population. Its largest industry with respect to labor and dollars and cents output is the clothing industry,—the men's clothing industry. The second, I believe, is the manufacture of ladies' fine shoes. Third, the making of cameras, photographic materials and the like. Fourth, the making of instruments—optical instruments, thermometers and things of that kind. Fifth, machine tools of various kinds. Perhaps next, the making of buttons.

The largest single concern in Rochester is the Eastman Kodak Company, with six or seven plants in the city with a total of about 12,000 employees in Rochester and vicinity. The next in size is the Bausch & Lomb Optical Company with about 4,500 employees.

The one thing remarkable about all the manufacturers of Rochester is the extent to which they make high quality goods. Those who have attempted to make cheap clothing and cheap shoes in Rochester, have failed. We make nothing in the city that is cheap. Remarkably true is this fact. I think it indicates something, however,—it shows that we have perhaps more common ideals in connection with our

manufacturing problems than have other communities.

We have thus a community concerned with *manufacturing* almost exclusively, manufacturing high grade goods only, and quite diversified in the character of goods manufactured; hence, we possess many advantages. Our community efforts have centered around our Chamber of Commerce and we feel tremendously proud of the Chamber's growth and its achievements.

Fortunately again, the Chamber of Commerce, concerned most largely with manufacturing interests, has not had to compete, as in some other cities, with a manufacturers' board of trade, a manufacturers' association, or an employers' association. Our interests have been for many years centered almost exclusively in that Chamber. The Chamber has taken a progressive stand on nearly all matters of community interest, and has been the leader. I shall be able to mention today only one or two achievements but these may be to you indicative of its work as a whole.

Some twelve years ago a committee of the Chamber assumed the responsibility of federating the charities of the city; and with the Chamber's backing, it successfully brought every single charity in the city into cooperation and into federation, one with the other.

The particular work of which I can tell you best—cooperation among the manufacturers—started possibly some ten years ago, when two or three of us in different industries (but brought together through Chamber work) started to exchange information concerning labor turnover. It was a new subject to us then. We had not heard it mentioned outside of Rochester. We attempted to get together and find a common basis for *computing* labor turnover, and as a result of those first exchanges of opinions, a group was formed of some twelve or fifteen execu-

¹An address at the Rochester, N. Y., meeting of the Taylor Society, May 7, 1920.

²Treasurer and General Manager, Art-in-Buttons, Inc., Rochester, N. Y.

tives, who for a good many years spent an hour and a half or two hours together each week at luncheon, on Wednesdays.

That little group was selected with care to represent the different industries of Rochester. There was one man from the shoe industry; two, I think, from the clothing industry; two from the camera interests; and so on. Out of those exchanges of opinions, I think, a great deal of cooperation developed. I want to emphasize, that all those men were actively connected with the Chamber of Commerce and were among the most active "juniors" in the Chamber at that time.

Through cooperation and exchange of opinions, the manufacturers of Rochester quite generally have come to feel that we in Rochester should pay rates of wages that are equal to or better than those prevailing in other communities, and to that end have endeavored to inform ourselves as to wages in cities like Cleveland, Buffalo, Syracuse, and Cincinnati. Where it was apparent that we should do so, there has been voluntary action to increase wages for labor in the city of Rochester. We have also come to feel that wages should properly reflect increases in the cost of living.

This work of cooperation led to the making of studies of the hours of work in other cities,—the *prevailing* hours of work; and I think (with some pride) we have secured more uniformity of working hours and working conditions in Rochester than you will find in almost any other city of which I have knowledge. We are constantly making investigations on that and similar subjects.

I can recall the time, a good many years ago, when the city as a whole—very largely so—was brought to the working basis of fifty hours. That was a real advance at the time, and yet it was brought about so that practically all the plants in the city were on that basis, with the exception of the clothing industry. That industry went to a forty-eight hour basis at that time. Later on the city was brought largely to a uniform basis of forty-eight hours, and with quite common rules regarding payments for overtime, time-and-a-half and double time for Sundays. This was in advance, if you please, of other cities. Many of these actions were in advance of the *war* developments which brought other cities to some degree of uniformity.

Some five or six years ago, the Chamber of Commerce of Rochester became interested in the work of the Executives' Club of Detroit, of which Mr. Boyd

Fisher was the acting head. We investigated at length the work of that Executives' Club in Detroit, and as the result of those investigations, the Chamber established in Rochester what is today known as the Industrial Management Council of the Chamber of Commerce.

With the idea that we have always had of coordination in Rochester and centralization of efforts in and about the Chamber, this Industrial Council was, of course, organized as a part of the Chamber of Commerce, and yet distinct in a way. It was necessary to raise large sums of money in order to carry on the work planned for the Industrial Management Council; and those concerns that were to receive the benefit of it were to pay. So while it was open to all of the members of the Chamber of Commerce, only those firms participated that paid their proper assessment.

We used as a basis of raising the funds necessary for the Industrial Management Council the number of employees in the different concerns; and, profiting a bit by the experience of the Executives' Club of Detroit, which did not provide sufficient funds adequately to finance itself, we adopted very high charges. We started our charge plan so that a small concern with 100 employees or less had to pay only a \$100 fee, but ran it up so that at least one concern in Rochester had to pay several thousand dollars per annum.

We had no difficulty in accomplishing this and getting the manufacturers to finance the Industrial Management Council; (of course, since then, salary conditions and wage conditions have changed materially). I am speaking now of pre-war times. At that time we felt that we had provided sufficient funds to finance the Industrial Management Council liberally on the basis of assessments.

The Chamber succeeded, when the Industrial Management Council was started, in bringing into it practically every large manufacturer of Rochester.

The purpose in raising large funds for the Industrial Management Council was to provide adequately for salaries and investigations. The expense of housing the Industrial Management Council was provided by the Chamber itself. The money raised was solely for salaried men—salaried secretaries and salaried investigators. It was our belief that cooperative effort must needs have back of it paid executives to make it most successful; and it was the aim of the group in establishing the Industrial Management Council that there should be funds in hand to maintain an adequately paid staff. The idea also was held that every *group* represented in the Industrial Management Council, to be

most successful in its work, should have the benefit of a paid secretary or assistant to handle its affairs.

The Industrial Management Council went through the war successfully, although handicapped by lack of organization. It evidenced the soundness of the proposal by continuing to grow, even through the war, and is today, I believe, on a very sound basis, with Dr. Elliott Frost in charge as director. It has a good staff to which he is now adding additional men.

The Industrial Management Council is organized into seven different groups: the managers' group; the superintendents' group; the employment and service group; the production methods group; the cost accountants' group; the office managers' group; and the tax group.

I should say this: that one of the reasons that led to the establishment of the Industrial Management Council was the fact that the Efficiency Society, which had been started in Rochester a little time previous to the formation of the Council, had found that it lacked something in this particular—that it didn't have a common interest for all of its members in all of its subjects. The feeling was quite prevalent here that we should bring into groups those who had a strictly common interest, and that they could go more deeply into the study and details of a problem if they were all dealing with the subject that was of importance to *them*. Thus we have in a large sense organized the city into the different groups, and each can bring up and discuss subjects of common interest. The Industrial Management Council was approved by the Efficiency Society before the Council was founded, and the work of the Efficiency Society was transferred to the Council.

The story of what has been done in Rochester perhaps can best be expressed in this way; I do not think that we have extreme development of *any one* thing. There are plants in other cities that have gone much further than any in Rochester in many *particular* phases. What I think *we have* accomplished in Rochester through these years is this; I think we have lifted the city and its manufacturers as a whole to quite a high average. We are on a higher and more common level than are the manufacturers in many other cities. The average is *high*. We have been dealing with all the manufacturers together rather than having extreme development or leadership in any particular plant or industry.

When the war broke out the situation with us was rather unique. We had been cooperating to a large extent, and successfully. The Industrial Management

Council had been established, and although not fully developed, it was functioning, and *successfully* functioning. Thus when the war broke out we were able to do many things in Rochester which were quite valuable to the city as a whole and to the government as well.

I want to refer to the war efforts merely as a little indication of what results can be accomplished through cooperation and coordination of community efforts. Early in the war, the end of May or early June, we met with Colonel Jamison, of the Ordnance Department, and after a conference we pledged the city of Rochester and its manufacturers to stand back of the Government in any work that it might ask us to do in Rochester, and to stand back of any plants that it might establish in Rochester to the end that no Government work in the city through the war should suffer for lack of labor, materials, supplies, or efforts, which the manufacturers of Rochester could arrange to supply.

I believe we made good in a very large sense on that pledge. To the best of my knowledge and belief, no war work in the Government plants in Rochester suffered one day from shortage of labor. With the consent of all the manufacturers who had been cooperating here, we pledged ourselves to a draft if the Government work needed machinists or other labor. This draft was enforced several times against the manufacturers in proportion to their numbers of machinists. We delivered machinists to the Government plants on requisition, and made drafts on the various plants when machinists were needed. The Government work in Rochester did not lack a man, through the war period, that we could supply.

In order to handle the labor situation, we early established in Rochester one of the ablest central employment bureaus, I believe, that was maintained by private enterprise in the country. Through the Central Employment Agency, the labor was diverted first to the needs of the Government plants and then to those manufacturers on war contracts; and only lastly to other plants.

We controlled ourselves so far as advertising was concerned, and competitive bidding for labor. I doubt if any city did more of this. As the war progressed, we went further. We made constant efforts to keep posted as to rates of wages in other communities, with the idea that we would pay in Rochester those rates, and raise our rates adequately to keep the situation in hand and satisfactory to our workers and all concerned.

There came one time when we agreed on certain

rates of wages after conference with the Government. In order to be sure that the community would be protected against its individual manufacturers, we employed at a very large expense, running up to \$15,000, experts who had full access to our plants to see that our workmen were properly graded and classed, and assured of the minimum wages that had been agreed upon between the manufacturers and the Government.

This particular work through the war was taken over by an organization slightly different from the Industrial Management Council for certain reasons, but different more in name than in fact. It was taken over by men who had been instrumental in establishing the Industrial Management Council, and who formed an organization known as The Underwriters. That organization is still in existence and in close cooperation with the Industrial Management Council and all affairs of the Chamber. The members belong to the Chamber, and are, of course, closely affiliated with it.

I have simply tried to paint a picture of how we have been endeavoring in Rochester to coordinate our efforts to the good of all concerned. I feel we have achieved many things. I believe that our wages throughout the city are on a high basis. We are constantly exchanging information and cooperating—trying to remove any possible causes of trouble. It is held that if trouble breaks out in any plant, or if we have trouble in any one industry, all will suffer, and the community will suffer. It is to the end that we conserve our efforts for the best of accomplishment that all these things are done.

I realize that your time here is well occupied with the Taylor Society meetings; and yet you want to accomplish the most possible from your visit to this city, and there may be an opportunity for some of you to crowd in a little extra in the hours between twelve and two o'clock. In view of the fact that our industrial management problems deal so largely with the human element and human relations, and more and more so as against the past, there may be some things which you will want to look into a little further while you are in Rochester, and to that end I am going to incorporate in my address a few announcements.

I have referred in the address to the Industrial Management Council of the Chamber and some of the activities of our Chamber of Commerce. You will, of course, see the buildings of the Chamber of Commerce because our meetings tomorrow afternoon and the banquet tomorrow evening will be held there. If you are interested at all in more of the details of the work, Dr. Frost, the director of the Council, will be at his office

Saturday noon from twelve until a quarter past one and be glad to answer any questions and give you any information you may want; perhaps show you the industrial management library and other features he may have there.

We have in Rochester a "Community Chest" for raising all of the funds needed by Rochester in its community effort, philanthropic and otherwise; also those efforts to which the city contributes outside of Rochester. If any of you wish to visit the headquarters of the Community Chest you will be welcome, and the officers will be glad to furnish you any information on that subject you may want.

A part of our cooperative efforts in Rochester dealing with the labor problem center round the problem of Americanization and perhaps the bringing of all the labor elements of Rochester into accord and into good understanding. Our Americanization work has expressed itself in many ways. We recently conducted a Homelands Exhibit here in Rochester which was a very great success. All the elements of labor in our community that might in any sense be classed as foreign were brought into cooperation in connection with an exhibit of handiwork, with music and folk dances and other exhibits, that lasted ten days. It was one of the most largely attended affairs ever held in Rochester and one of the most successful. It was financed by the manufacturers of Rochester, who contributed on the basis of 50c per employee, and cost somewhere between \$20,000 and \$30,000, I believe. You may wish to know more about the Americanization work and this Homelands Exhibit. You can secure information regarding it at the Chamber of Commerce.

Another part of our work, perhaps an Americanizing work in one sense, has centered around our Industrial Athletic and Recreational Association of Rochester. This is composed of some thirty odd plants, not the very largest. The Eastman Kodak Company has its own athletic leagues because of its 12,000 employees, but in the membership of the Industrial Athletic and Recreational Association are some thirty odd plants, composed of those with 200 or 300 up to 1,500 employees. This Association is having a very remarkable record in Rochester in bringing all the working people of different types together in common understanding.

Just briefly, let me refer to some things. During the past winter this Association conducted sixteen dances in our Convention Hall; seventeen boxing tournaments—it is a rather interesting fact that we attract to these boxing tournaments a very large percentage

of the foreign element, so-called. The attendance at these boxing tournaments crowds the hall—if the hall were bigger the demand would be sufficient to fill up a hall two or three times as large. We have to limit the attendance. There were during the winter forty bowling teams representing different factories, twenty-four of men and sixteen of girls.

There was a basketball league with twelve teams of men and six of girls. The Association also conducted a musical festival during the winter.

For the present spring and summer there is an organization of baseball leagues with forty teams, twenty-four of men and sixteen of girls. This would be much larger, except that we are limited by the number of diamonds available. We haven't enough diamonds to put in a larger number of teams.

There is a pushball league for both men and women; a volleyball league for men and women. There is a tennis league for men and women. Sixty teams are in the quoits league. This Industrial Association will conduct a series of outdoor dances and twelve outdoor boxing tournaments during the summer. It has also organized a motor cycle league and a bicycle league.

WILLIAM B. DICKSON, Chairman of the Board and Vice-President of the Midvale Steel and Ordnance Co., writes as follows in *The Annals*, No. 174, page 13.

Most men have a test which they unconsciously apply to their fellows. With some, it is their form of religious belief; their party affiliations; their intellectual attainments; or their social or financial status. As I grow older, I find myself applying to all men with whom I come in contact, this test: Is he democratic or aristocratic in his ideals? And to the extent that he puts into practice in his daily life either of these ideals, I am attracted to or repelled by him. I have been mazed, and at times disheartened, at the number of men and women born and reared in the United States, who have no true conception of the ideals on which our government is founded; and not all of these, by any means, have been found among the rich. Like Louis XV, they appear quite content to act on the idea—"after me, the deluge."

An aristocrat is one who tries to get out of the social order more than he contributes to it, i. e., he wants something for nothing; his ideal social system is one where the permanency of his unearned income is assured at the expense of his fellow-citizens; and he is serenely regardless of the fact that in order to accomplish this economic miracle somebody must get nothing for something. There are a great many varieties of aristo-

The trouble with this Association is that it cannot accommodate all the factories that want to join. There are seventeen factories which are held on the waiting list because we cannot handle with sufficient grounds and diamonds all the demands.

The league publishes a paper, "The Industrian," which is subscribed to by the employees who wish to take it. An interesting part of all this work is that both the employers and the employees pay. The dances and boxing tournaments—the dances especially—constitute a source of revenue and those who attend pay. Some 30,000 people attended the dances and paid entertainments during the past winter. Employees thus pay towards the work of this league.

Plans are being formed in connection with this Association to establish a recreational park on the lake shore which will be for the benefit of the employees.

I have been able to tell you only briefly of this activity. Mr. Bodine, who is the director of it, will be at the Chamber Saturday noon between twelve and two o'clock, and will be glad to tell any of you who are interested in the matter more about this cooperative effort in Rochester.

crats, ranging from the common hobo, who comes to your back door to receive his unearned bread, up to the politicians, most lawyers, some Napoleons of finance, kings and kaisers; and they all have in common one very interesting trait, i. e., a profound contempt for those from whom they draw their unearned sustenance. The cootie is your true aristocrat. If it were possible to penetrate into the mental processes of this parasite, we would doubtless find that it has a profound contempt for its host. I would, therefore, suggest as the proper heraldic device for the man who draws more out of the social organism than he contributes to it, i. e., one of the so-called aristocrats or privileged class—"a cootie couchant on a field of gold."

But the term of reproach which always interests and pleases me most is, "radical." I am glad to be called a "radical" providing I have something to say as to the definition of the term. I accept that which Gladstone gave when he was once asked to explain the difference between the British parties. His definition was as follows:

Conservatism—Distrust of the people, tempered by fear.

Liberalism—Trust of the people, tempered by prudence.

A Radical—A Liberal in earnest.

The dictionary defines "radical" as, "of or pertaining to the root; fundamental; thorough." If, when I am gone, those who knew me best could honestly write as my sole epitaph: "A Radical, worthy of the name,"—I could not wish for a more honorable remembrance.

BALANCE OF WORK¹

by

WILLIAM D. HEMMERLY²

AN increasingly important function of scientific management, but one for which very little concerning its development and application has so far been presented, is the balance of work.

In an industry managed according to scientific management principles, it is necessary to create a mechanism which will make it possible for the management to ascertain accurately, constantly and instantly the condition of the plant so far as work ahead is concerned.

The Sales Office should be advised as to available manufacturing capacity so that delivery promises may be more intelligently made and selling policies modified if necessary.

The Employment Department should be kept informed as to various classes of help available at all times so that proper steps may be taken to properly adjust conditions in this respect.

The Mechanical Department should be notified as to the status of special tools, jigs or fixtures so as to eliminate delays due to insufficient manufacturing equipment of the sort it is responsible for supplying.

Even with the pronounced advantage of properly planning work ahead of machines and operators through the medium of the route sheets, tickets, planning boards, pneumatic tubes and an excellent order of work or scheduling scheme, it has been demonstrated that the balance of work supplies a basis for better planning than was possible before its introduction.

The advantage of the balance of work function is already recognized by some of the leading managers and management engineers of the country, and is conceded by them to fill a long-felt want of the Planning Department, and where successfully used, it is so used because it stands on its own merits; it is probably due to the fact that its importance is not recognized or that its existence is not realized that it is not more commonly used in existing planning departments today.

It is obvious that the balance of work function is more easily started in planning departments already successfully operating, and it is not considered wise to

attempt to start the balance of work methods in the pioneer stages of the Planning Department development, but to introduce them as soon as a certain degree of perfection of production control has been attained. This period varies in different plants, but ordinarily would be as soon as the route sheets, time cards and schedules are successfully operating.

The balance of work is based on the factory's manufacturing unit, which may be the pound in plants such as bleacheries operating on a tonnage basis, the yard in concerns such as cotton goods finishing plants running on a yard basis, but preferably should be the time unit, especially if the time factor is obtainable as in plants operating on a bonus basis.

In order successfully to operate the balance of work function, it is necessary to ascertain and maintain statistical information regarding the actual manufacturing capacity of all existing machines or work places, employees and special tools on a weekly basis. This information is usually obtainable from data already on hand in the Planning, Employment and Mechanical departments.

Several types of mechanism for maintaining the balance of work have already been successfully used, but the type of equipment to be adopted depends largely on circumstances or local conditions and opinions.

A sorting tray method illustrated in Fig. 1 has been considered desirable by some.

An index visible (Fig. 2) has been used by others.

A hook type planning board (Fig. 3) has been chosen by others.

Any one of the above types is acceptable because it serves the purpose ideally if it is assured that it properly ties in with existing methods or mechanism and harmonizes with the policies and conditions of the factory.

Whatever the type of mechanism to be used, its general arrangement is the same as that of either of the others, and the pockets in the trays or the card holders on the index visible or the hooks on the boards are labelled so as to indicate by classes the available manufacturing capacity for each of four weeks, it being considered important to submit weekly balance of work reports to

¹A paper presented at Rochester, N. Y., meeting of the Taylor Society, May 7, 1920.

²Thompson and Lichtner Co., Boston and New York.

the management covering a four week period, beginning with the current weeks. These available capacities are changed as the equipment or personnel varies.

The weekly available capacity of all classes of machines, operators and tools is determined by ascertaining the number of hours the plant is operating in a week and multiplying this by the number of machines, operators or tools available.

In determining the available machine capacity due allowance should be made for unavoidable idleness, such as time required to supply sufficient steam pressure to dry cans in finishing plants before they are started each morning. Similarly, proper allowance should be made for special machinery which is used only at intermittent periods, such as extra large planers for certain work in machine shop practice.

Likewise, in ascertaining available labor capacity a proper allowance should be made for absentees.

Ordinarily no allowance is necessary in determining available tool capacity, especially in plants where through a modern central tool room all special tools are constantly maintained in usable condition.

For balance of work purposes the available quantities should represent the actual net available manufacturing capacity in all cases, so that when comparing work assigned to capacity available no deduction is necessary to ascertain how far ahead equipment is booked for current orders or the earliest time at which manufacturing capacity is available.

Using the existing route sheets and manufacturing schedule as a guide, balance of work tickets are prepared for each operation of every lot or order as follows:

One machine ticket (Fig. 4) for each operation to be done; this ticket contains the order symbol, name of operation, quality, bonus time allowed, the date by which the operation is scheduled to be completed and the machine class symbol.

One labor ticket (Fig. 4) for each operation to be done containing the order symbol, name of operation, quality, bonus time allowed, the date the operation is scheduled to be completed and the labor class symbol.

One tool ticket (Fig. 4) for each operation requiring such special tools for which a balance of work statement is to be submitted, containing the order symbol, name of operation, quantity, bonus time allowed, the date by which the operation is scheduled to be finished and the tool class symbol.

These forms should be so designed as to permit their preparation on a duplicator and from the same original from which time tickets, move orders, inspection tickets, etc., are made.

A balance of work report (Fig. 5) is used in submitting weekly balance of work statements to the general manager, employment manager and mechanical superintendent and such other executives as may be designated.

The report is divided into three major sections, one each for machines, labor and tools. Each of these sections is sub-divided into minor sections as follows: Class, 1st week, 2nd week, 3rd week, 4th week. Each of the twelve weekly sections has two columns, one headed "Available" and the other "Assigned."

The various permanent machine and labor class symbols are listed in the class columns in such fashion as to segregate machines by classes of employees operating them. The tools are listed by classes regardless of the class of machine or operators using them, since a special tool may be required by a number of different classes of machines and operators.

The balance of work here described used the hook type board and is operated in a plant controlled from a central Planning Department using route sheets, schedules and times cards and having bonus time allowed factors available.

As balance of work tickets are prepared they are arranged on the board by machine, labor and tool classes and according to weeks in which the jobs they represent are scheduled to be completed, thus indicating work assigned to various classes of manufacturing capacity by weeks, but which has not yet been completed.

As finished time cards are received they are used as authority to remove their corresponding balance of work tickets from the board, all remaining balance of work tickets, therefore, represent jobs assigned but not completed. This particular arrangement of the balance of work tickets offers a very simple and satisfactory means of compiling lists of jobs scheduled but not yet completed, and is especially valuable in making statements of jobs not being kept up to schedule. Usually a more laborious method is necessary to properly ascertain which jobs, if any, are overdue. Sometimes it is done by actually referring to a large number of route sheets or schedule sheets, and, depending on the number of sheets to which it is necessary to refer, is more or less inaccurate.

At the end of each week (or oftener if desired) the balance of work report is prepared and the entries thereon are supported by the information on the board and on the balance of work tickets arranged on the board.

The actual work assigned to each class is entered in the four assigned columns, one column for each week.

This information is obtained by totalling the time periods or quantities appearing on all balance of work tickets on the board at the time.

Assigned quantities exceeding available quantities are entered in red so as to emphasize this condition whenever and wherever occurring. The balance of work reports may be used to great advantage in plotting curves to demonstrate in condensed form the fluctuations of work ahead of the factory and historically represent "feast or famine" conditions.

This feature has an important bearing on the determination or changing of policies in connection with attempts to minimize periodic unemployment in industries engaged in a seasonal business.

It is really surprising to note the conditions usually shown by the adoption of the balance of work method.

A certain cotton goods finishing plant was being operated in such fashion as to practically guarantee that the prescribed tonnage was put into process in the grey room, but without proper regard to the condition of the departments subsequent to bleaching. The management was proud of the fact that the required quantity of goods was put in each day, but could not understand why the finishing departments were constantly overloaded and that only by superhuman effort on the part of the foremen and constant urging by the Sales Department it was possible to give the howling customers anything like even periodic service; nor did it appreciate the reasons for the tremendous quantity of goods in process at all times with the natural congestion in the factory, shortage of trucks and abnormal amount of soiled or otherwise damaged material.

By the introduction of the balance of work, the condition improved and the policies of the plant were changed to such an extent that goods were more intelligently put in and therefore more economically finished and the service to the customers improved.

The management was also convinced that there is an advantage in reducing tonnage put in on certain days, since the disadvantages resulting in the bleachery were more than offset by advantages in the finishing departments.

The proper operation of the balance of work makes it possible to visualize conditions in the entire plant just as the planning board makes it possible to visualize conditions in any specific department insofar as work ahead of individual machines is concerned.

The balance of work offers finally a simple but effective means of submitting condensed statements of conditions to the executives for any period desired, and

these reports when intelligently studied offer scientific data which should and usually do make it possible to operate an industry more nearly as it should be to insure greater production, higher wages, lower costs, proper working hours and better service to customers, and thus prepare it for the rapidly returning days of competition.

DISCUSSION

H. K. HATHAWAY:¹ As Mr. Hemmerly points out, that feature of scientific management mechanism known as the balance of work has not received discussion or attention commensurate with its importance. It is not a new problem, however, for as Mr. Hemmerly will no doubt recall, he and I struggled with it some fifteen years ago under the guidance of Mr. Barth and Mr. Taylor, who long before that had known its importance and developed certain methods for meeting the need. In few plants has it been so carefully worked out and applied as have other features—such as routing or stores control. Usually some makeshift is devised, and made to suffice. One possible explanation of this condition is perhaps that inertia or a sense of helplessness on the part of those in the management, upon whom correction of faulty conditions shown up by the balance of work depends, discourages its further development. I have seen cases where the production clerk, or superintendent of production kept on presenting to the officials conditions crying for correction which were brought to light by the balance of work, but to no avail. Another reason may be that in a large measure the Planning Department bulletin board (or planning board as Mr. Lichtner has suggested it be renamed) affords in itself a large part of the information required. As generally operated it shows for each machine or work-place (a) jobs at machine or work-place ready to be done; (b) jobs ahead for which material is on hand, not yet ready to be done (i.e., having preceding operations yet to be performed). The operation orders may be made also to show, as in the mechanism described by Mr. Hemmerly, the period during which the work should be done, without which a balance of work is not very satisfactory so far as making promises is concerned, especially in a business where some of the customers' orders are received considerably in advance of the delivery dates wanted. Even then, however, the Planning Department bulletin

¹Consulting Engineer in Management, Philadelphia.

tin board is not very satisfactory as a means for ascertaining the amount of work ahead of each machine or class of machines by chronological periods. In general practice the operation orders are not transferred from the route file to the bulletin board until the materials are on hand; this is, I take it, one of the reasons why Mr. Hemmerly's scheme calls for the use of a separate board. Its greatest shortcoming is, however, so far as balance of work purposes are concerned—and this fault seems also to be inherent to a considerable degree in the development described by Mr. Hemmerly—that it does not show the amount of work represented by the manufacturing orders that have been issued but which are still in process of planning, nor the work represented by customers' orders received far in advance of shipping dates—for which manufacturing orders are not due to be issued for some time.

In a plant where there is comparatively little variety in the product, where it all, or each class, passes through the same processes, a more or less accurate approximation may be made immediately upon receipt of the customer's order and corrected, if necessary, after the work has passed the instruction card or rate setting operation in the Planning Department. On the other hand, in a plant doing a miscellaneous class of work, such as building special machinery, this cannot be done even approximately until after the planning has progressed far enough to indicate the character and amount of work involved in the operations on component parts and their assembling.

When the character of the product permits previous to planning, the determination of the number of units of work—in time or its equivalent—a simple and reasonably satisfactory plan is to have for each operation (or machine) involved, a sheet ruled in vertical columns representing time periods during which work should be finished. As soon as a manufacturing order is issued (or in some cases upon the receipt of a customer's order) the units of work for the various operations are entered under the appropriate columns on the sheets for the operations involved, and added to the previous balance. As work is completed, a corresponding entry and subtraction is made. This is approximately the scheme developed by Mr. Taylor and Mr. Barth as an integral part of the routing system. Mr. Barth will no doubt recall the difficulties he had in making me understand,—all this back in 1904 or 1905.

From the sheets I have mentioned, periodic reports may be drawn off for the manager and others con-

cerned, and I believe that such a report should also include a statement of work actually in process in the plant as shown by the bulletin board.

The next question is, will the manager make use of these reports? He may, especially if the production clerk, production supervisor or superintendent of production, as you may prefer, is strong enough, rude enough, and persistent enough.

SANFORD E. THOMPSON¹: I wish to call attention to the fact that this is one of the mechanisms which ties in with the administration—the so-called administration—problems that have been brought up today in giving information to the executives on questions of purchase and sales. No matter whether our factories are running full or running at a low ebb—but particularly when they are running full—the question of what goods can be sold, what goods can be best manufactured and manufactured in the immediate future, and the question as to what goods shall be ordered, what material shall be ordered for the manufacture of the articles which are most needed, are of the utmost importance to the executives.

These questions are partially answered by the mechanism of the balance of work described by Mr. Hemmerly.

JOHN W. CARTER²: This being the first meeting of the Taylor Society that I have attended, I was a little reluctant at first in permitting my name to be used as one to discuss anything that takes place in its meetings. I represent a firm, as you all know, who are pioneers in the administration of their affairs under the Taylor system, and who are at the present time carrying on their business under what I would consider the orthodox Taylor System. Nevertheless, we do not wish to live within the confines of our own four walls, but we want to know what the other man is doing.

There are some things, however, that I cannot dismiss from my mind in looking over this paper of Mr. Hemmerly's, and I shall confine my discussion to a very few questions.

In his paper he states that there is another bulletin board being used in connection with a regular Planning Department board which, to me, seems like a superabundance of mechanisms. What advantage is there in having a separate and additional bulletin board to control the balance of work when the unit and total times appearing on these tickets just mentioned are an exact duplicate of those appearing on the operation

¹Consulting Engineer, The Thompson and Lichtner Co., Boston and New York.

²Tabor Manufacturing Co., Philadelphia.

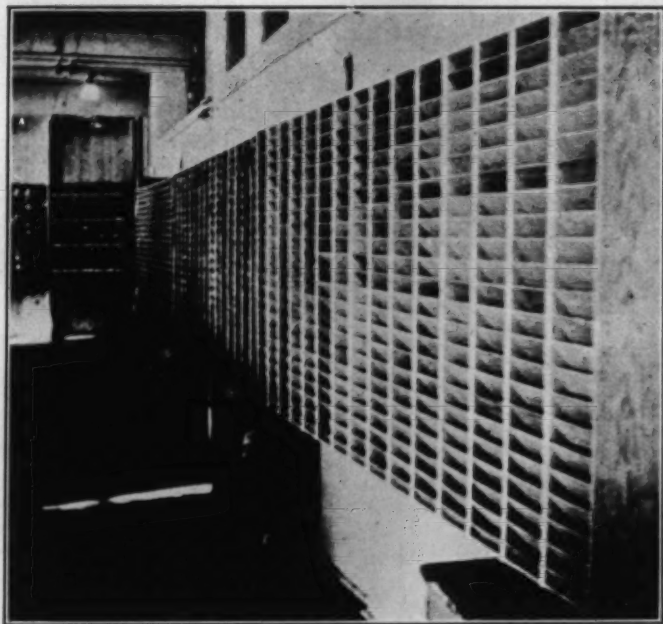


Fig. 1. Sorting Tray Mechanism.

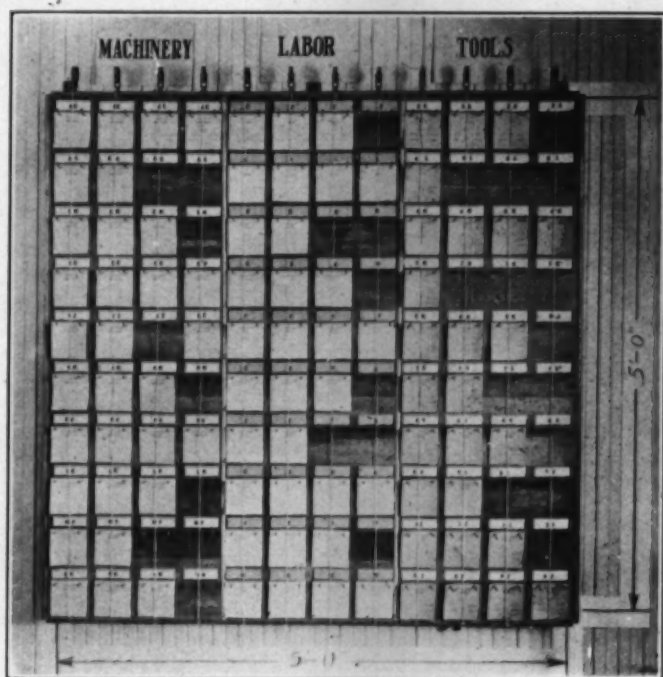


Fig. 3. Hook Type Planning Board.

tickets such as are used on the bulletin board of the Tabor Company, which is the ordinary three-hook type?

Can we not arrive at the same machine and labor capacity by totalling the time units on the operation orders and use this as a basis for a daily and a weekly report?

I do, however, like the balance of tools and most heartily agree with Mr. Hemmerly. Very frequently



Fig. 2. Index Visible Mechanism.

a special tool is in demand by two or more operators at the same time, and this condition is not known to anyone but the tool room foreman; and quite often this fact is not discovered until it is too late to change the order of work on the Planning Department bulletin board without loss of time to both management and workman.

FRANK D. WHITE¹: There are two questions which are not clear to me that I should like to inquire about. First: I understood the Sales Department was responsible for the promise on the orders to the customers. In other words, they were to be advised by the Planning Department, from the balance of work, as to the deliveries they could make to the customers. It seems to me that it is the function of the Planning Department to make these promises and submit them to the Sales Department. I am not averse to giving the Sales Department a copy of the balance of work and all the information which the Planning Department has showing what work the factory has scheduled and what it can produce, but it seems to me that if the Sales Department is allowed to promise the orders that it will be almost impossible for the Planning Department to make an order of work which they can hope to operate.

The other question on the balance of work is the four-week period. I wondered if it were the intention to submit the balance of work for four weeks only to the Administrative Department, or whether this was carried for the entire period for which the factory had work ahead. In our plant we have started to work up a balance of work, and in doing so we are using the chart as illustrated in Mr. Gantt's book entitled "Organizing for Work." This shows our actual production

¹Eaton, Crane & Pike Co., Pittsfield, Mass.

full scheme, as he put us on to it at the Tabor plant, two totally different kinds of route sheets were made up for each machine to be built, viz., one set consisting of a sheet for each part and listing in consecutive order the several operations to be performed on it, in the now commonly practiced manner; and another a set of sheets on which all the operations for all the parts entering into each sub-assembly of the complete machine was relisted according to its kind, such as turning, planing, milling, drilling, etc., together with the estimated time for each operation, and all of these added to a total of estimated time for each kind of operation into what was called batches of operations.

The progress sheet for the whole machine was then a short résumé of these batches of operations for the several sub-assemblies, arranged with the usual Taylor check lines for the instant disclosure of the batches of operations completed to date as against those not yet completed or even not started. Mr. Hemmerly, you must surely remember that progress sheet?

MR. HEMMERLY: The only progress sheet I remember is where they kept a record of the various parts that entered into assemblies and sub-assemblies, and checked them when completed.

MR. BARTH: Well, it was the frequent failure to check off a completed operation on the batch of operation sheet after first checking it off on the route sheet for the proper part to which the completed operation belonged, that caused the kind of progress sheet for the whole machine in use at that time invariably to show less actual progress than had been made, and that finally led to its abandonment in the Tabor plant. However, I still consider the scheme an excellent one, and much regret that I have never had a chance to reinstate it nor to take it up elsewhere. My recollection is that this happened only after Mr. Hemmerly had become production clerk for the Tabor Company, but I am evidently wrong about this. If Mr. Hathaway were here he could probably set me straight on this point.

However, to give you another instructive illustration of the numerous ways in which excellent schemes may be so carelessly handled as to prove utter failures unless somebody has the experience or knack of quickly laying his hand on the difficulty. At the Link Belt Engineering Company, as part of Mr. Taylor's policy of complete financial surveillance, the new auditor of purchases was started on keeping a running balance of the total value of outstanding purchase orders. After some three or four months he came to me one day and said that he so far had failed to keep his balance cor-

rect, as proven by a substantial discrepancy between this balance at the end of each month and the actual total of outstanding purchase orders, which he had taken the trouble to ascertain for comparison. Each month he had corrected his balance, but still it was always again out at the end of the month.

From what Mr. Taylor had told me about the reason for Mr. Wm. Sellers & Company's difficulty with their balance of hours of work, I at once suspected that our auditor's trouble was of the same nature, and so it proved.

Some of the purchase orders he received could give only an estimated value, and in a case where this was only \$20.00 he had correctly added this to the balance; but when the bill for \$22.00 finally came in he had deducted this actual value instead of only the \$20.00 estimated. Immediately I showed this up he exclaimed: "Well, how could I ever do it?" and I said: "Yes, how could you ever do it?"

The ultimate difficulty in installing and maintaining scientific management is after all the training and keeping together of an organization that will do the little commonsense thinking that is necessary to success in any undertaking or action; and it is indeed discouraging continually to be handicapped in one's effort to accomplish something worth while, by the careless and thoughtless acts on the part of numerous members of the average organization. There is something radically wrong somewhere, but I don't just know where the fault lies.

MR. HEMMERLY: I should like to suggest that a careful reading—my delivery may not have been as good as it should have been—but a careful reading of the paper, I hope, will demonstrate that the purpose of the balance of work is not a duplication of the bulletin board or the planning board, as we call it; but that it is in a sense a cross-index. In other words, if you make two tickets instead of one for each operation and used one as a cross-index, you would then have just what you get through the balance of work, but you would only have the information in so far as actual jobs planned is concerned.

With the use of the balance of work function—and I don't claim to be the originator of this by any means—you can plan work practically as fast as orders are received, and, therefore, you can through this cross-index arrangement, as you might call it, ascertain a whole lot more than you can from the tickets representing work planned ahead of actual machines on the planning board.

If you will just get that one point, it is considered as a summarized cross-index of all the work planned by machines on the one hand, in the same room or in some other room, plus some information as to jobs that are scheduled to be done—and every job should be scheduled as soon as it is ordered; then you will have a balance of work.

You understand the present use of the planning board: planning work ahead of individual machines. In some places it is done by using three pairs of hooks for each machine, the first pair of hooks representing the job on the machine, the second pair the jobs at the machines and ready to be done; and the third pair the jobs assigned to the machine but not yet ready to be done, because some previous operation is not completed. That part of it, I take it, we all understand.

Right there, I wish to say, another way of getting the same result (you may not call it orthodox) with a whole lot less wall space, would be to use one pair of hooks for a machine, representing the job on the machine, and the jobs ahead of the machine, and, if you please, the jobs assigned to the machines but not yet ready, although the latter is something that I personally don't believe in. I believe in one pair of hooks representing the jobs on the machine and jobs ahead of the machine. I have been converted to that within the last two years, and I think I know something about using planning boards because I happened to be a

party to the first planning board that was ever operated.

Mr. White asked the question as to why one uses four weeks as a period to be covered in these balance of work statements. You can use one day or one year, or any period of time you see fit. Ordinarily, four weeks is the period covered, although in one of the last jobs I was on it was found that three weeks would be ample, and it simplified matters considerably. So the report was made up on a three-weeks basis.

I can't help but again refer to the importance of recognizing that the balance of work, as I have outlined it, is a cross-index. In a way, it might be compared to Gantt's layout sheets, and I am familiar with those because I had the privilege of working with Mr. Gantt for several years.

Flexibility is one thing you can't easily get with a layout sheet, but you can get flexibility with the ticket arrangement on boards.

I don't know that there is anything else that hasn't been answered. I should advise that this paper be carefully read if anyone is interested. You can enlarge on all of those three elements that I spoke of: namely, machines, labor and tools. Through further development you can even handle the sales end of it and have the benefit of contemplated business. There seems to be unlimited possibilities in the balance of work and its benefits.

CONCERNING the business values of the collective bargain, Tead and Metcalf in "Personal Administration" (p. 450), write:

If it is true that the individual bargain places upon management an impossible burden of responsibility, it is necessary to see whether the collective agreement is of value in reducing this burden. What are the ways in which it may have business uses?

First, the collective agreement tends to equalize the bargaining status of workers and employers. Surprising as it may seem this is of advantage to the employer. It is an axiom of good business management that effective production depends in the long run upon a relationship between the interested parties characterized by a high sense of mutual self-respect, regard for individual dignity and equal status.

"The real basis of equality in a democracy," it has been well said, "is not equal pay, but equal dignity of function." That sense of equal dignity and mutual self-respect is at the same time the basis of goodwill in joint relations, and the result of bargaining on a basis of approximate equality. Equal bargaining power may and should thus mean a relationship of goodwill and personal amity. Where this is not the case, where under a joint contract there is constant fric-

tion and quarreling, the difficulty is usually not due to the collective feature, so much as to those natural personal clashes and bickerings which have really nothing to do with collective bargaining as such. Only among equals can there be true loyalty, permanent interest in the joint enterprise, continued regard for the personal aims of each individual in relation to the common purpose of the group. . . .

Again, only among equals can there be justice, or a sense of the possibility of obtaining justice when differences arise. A group's conception of what constitutes justice will admittedly change from time to time. But that does not alter the fact that what they now think is justice is vastly precious in their eyes; and that the conditions or terms under which they work and the system under which they live are unjust. Such a sense of injustice is certainly somewhat modified by the use of collective dealings; even if some other type of relationship may eventually be necessary to satisfy later and more exacting conceptions of a just industrial order.

To the extent, therefore, that joint dealings create a sense of equality and justice, they may contribute as nothing else can to the creation of goodwill and a cooperative spirit in the process of production. And, once the negotiations are completed and terms agreed upon, there is every advantage to both sides in fostering this atmosphere in the shop under which alone the work can go forward quickly and well.

THE NECESSITY FOR STANDARDS IN THE RELATION BETWEEN ILLUMINATION AND OUTPUT¹

by

WARD HARRISON²

ARTIFICIAL lighting is often judged as good or bad depending upon the degree wherein it differs from the daylight conditions to which we are accustomed. Granting for the present that such a basis of valuation may be a reasonable one, it is of interest to investigate the most usual differences between daylight illumination of interiors and its substitute. The two most common points of differences are: first, lesser diffusion of light—that is, small sources of high brilliancy cause glare and objectionable shadows as con-

trasted with the large light-giving areas of low brightness, such as the windows; second, lesser quantity of illumination both on the work and on adjacent surfaces. Inferiority in respect to diffusion of light (glare), altho almost universal, is unquestionably a matter of neglect or of misapprehension of the principles of illumination, for today well diffused light costs little if any more than the other variety. On the other hand, the question of the quantity of light to be supplied is usually considered to be an economic one. True, a certain minimum illumination is necessary to provide against accident, and should be supplied without regard to cost, and for certain operations a considerably greater amount than this minimum may be required to conserve the vision of the employees. In passing it may be noted that both of these factors are now recognized in the industrial codes of several states. On the other hand, the experience of those who have investigated the subject most thoroughly is that in the majority of industrial operations it is not either one of the foregoing factors, accident prevention or conservation of vision, which should finally fix the quantity of illumination to be supplied in a given case.

In examining the works of a watch we almost involuntarily move over toward the window, although the illumination at all points in the room may be far above that ordinarily required to prevent eye strain. *We find that we can see more with increased illumination.* An examination of the Snellen's Chart under two degrees of illumination, say one foot-candle and ten foot-candles³, will serve to confirm this belief. Again,

¹The foot-candle meter (Fig. 2) is a small, portable instrument which measures illumination directly in foot-candles. Since the foot-candle is rapidly becoming recognized as the popular as well as the scientific measure of illumination, this meter is a very practical measuring instrument. Technical knowledge of photometry is not required in its use because the adjustment is simple and determinations are made without the assistance of mathematical calculations. The foot-candles of illumination at any place are indicated by the point where the spots on the foot-candle meter screen change from brighter than their background to darker. The scale reproduced in Figure 3 indicates an illumination of nine foot-candles.

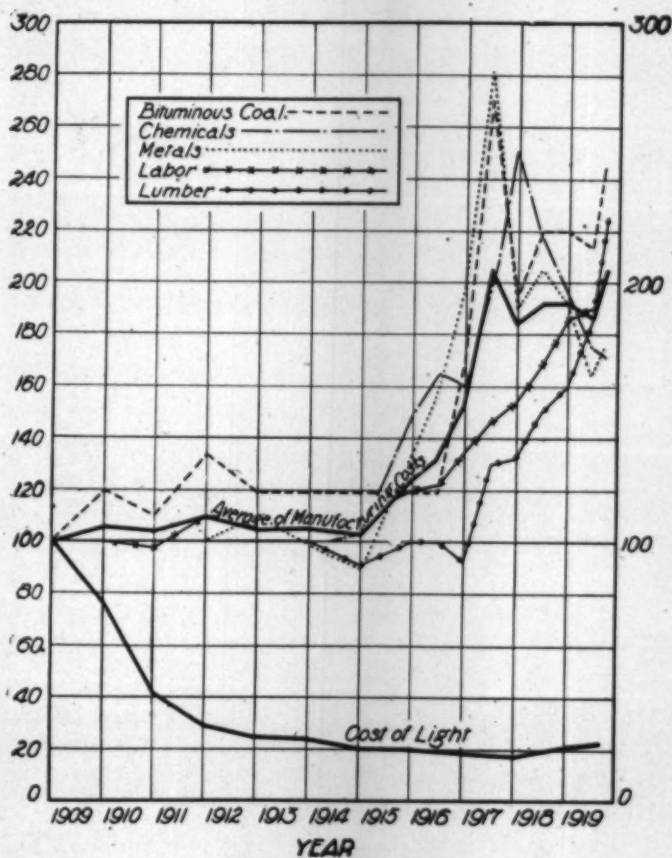


Fig. 1. Relative Cost of Light.

¹A paper presented at the Rochester, N. Y., meeting of the Taylor Society, May 7, 1920.

²Illuminating Engineer, Cleveland, O.; Chairman Committee on Reciprocal Relations, Illuminating Engineering Society.

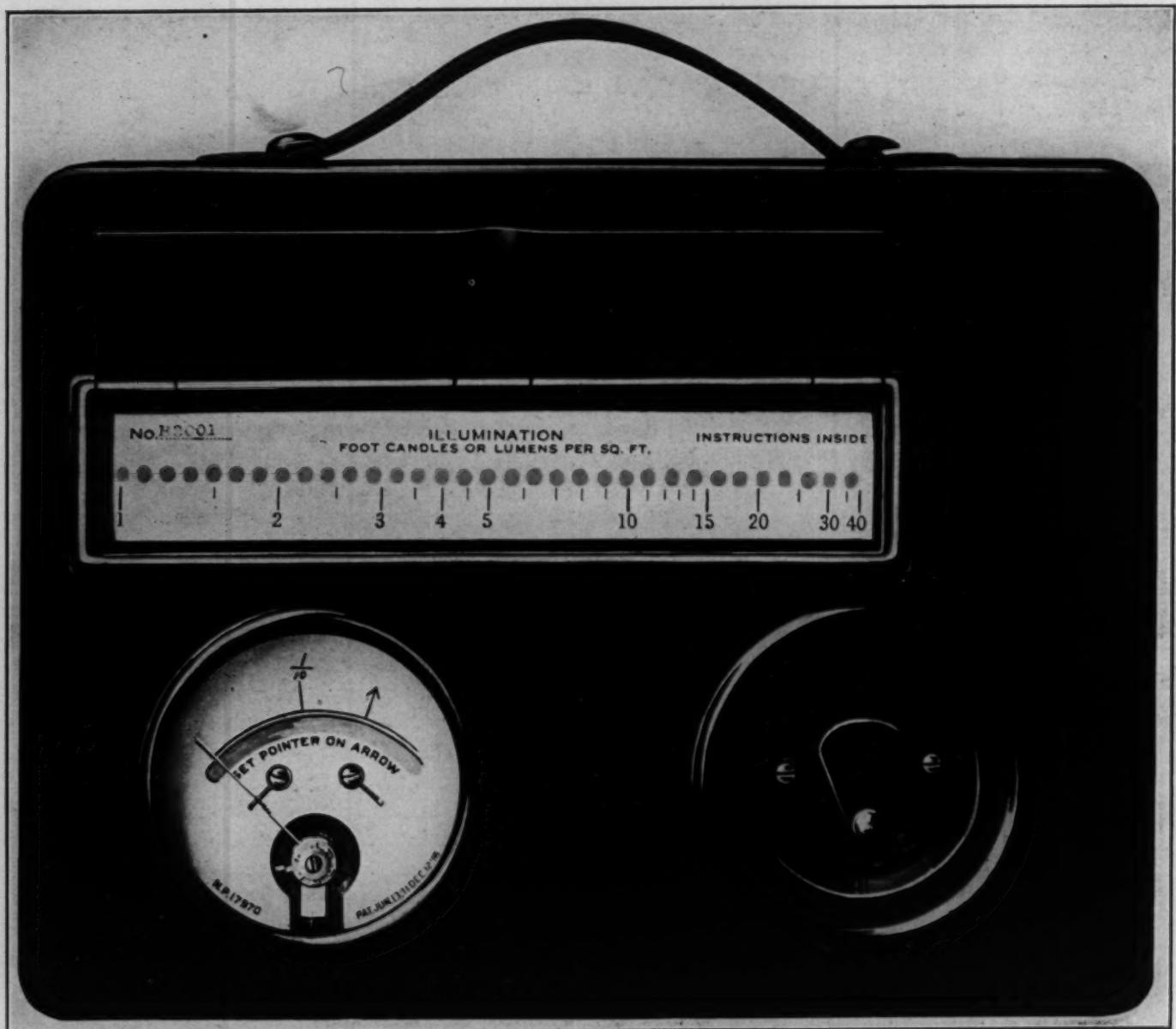


Fig. 2. Foot-Candles Meter.

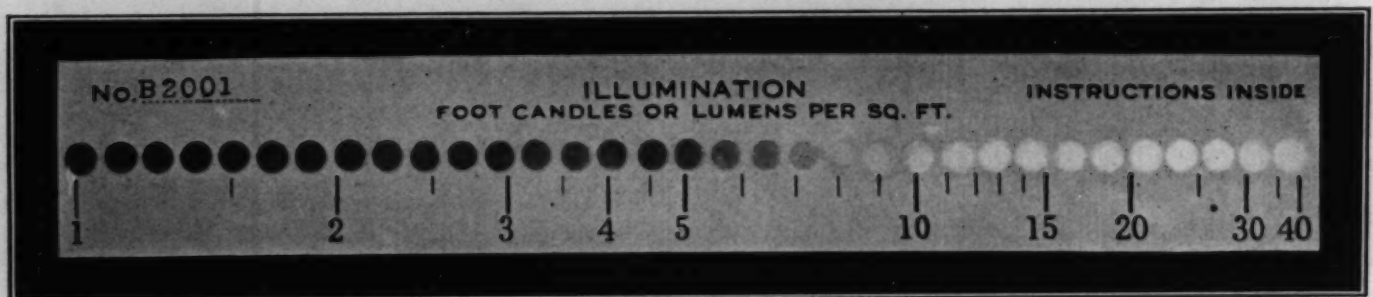


Fig. 3. Detail of Screen, Indicating 9 Foot-Candles.



Fig. 4. Well Lighted Room—Adjacent to Room Shown in Fig. 5.

we all know that a late afternoon tennis match must stop long before the ball, stationary, has become invisible to the players. *More light is required when objects in motion are to be discerned, or conversely, one's quickness of vision depends upon the degree of illumination supplied.* Likewise, if, after an illumination has been reached under which we see both quickly and easily, the quantity of light is continually increased, it is reasonable to suppose that we will eventually come to the point where there is too much light, and where our ability to see is actually diminished thereby.

In reality, however, there is little likelihood of ever getting our general level of artificial illumination too high, particularly in view of the fact that average outdoor illumination on a cloudy day is something like 1,000 foot-candles (units of illumination) and that a snow field does not become uncomfortably bright until

illuminated to perhaps 5,000 foot-candles. Artificial illumination in industrial plants usually falls between one-half and ten foot-candles with a pronounced leaning in the direction of the smaller figure. Good indoor daylight is ordinarily considered to be not less than fifteen foot-candles.

At this point the main thesis of this paper at once suggests itself. How far does it pay to go? How many foot-candles should be supplied for a given operation in order that it may be conducted most economically, taking into account both the cost of the lighting and the possible increase in production and decrease in cost of manufacture which results from the change in lighting? Such positive knowledge of the subject as there is now available may be expressed in a very few words.



Fig. 5. Poorly Lighted Room—Adjacent to Room Shown in Fig. 4.

First: Night shifts, or for that matter, evening shifts, are notoriously inefficient. Their production averages from ten to twenty-five per cent less than that of day shifts. The difference is due, in part at least, to the inadequacy of the lighting ordinarily supplied.

Second: In plants averaging, say, 100 square feet of floor space per employee the cost of good artificial lighting per foot-candle supplied is usually not in excess of 0.1 per cent of employees' remuneration during the period.

Third: It is the consensus of opinion that while good lighting, as well as all other hygienic conditions, is conducive to a willingness to do more work, the increased production resulting from improved illumination is not due chiefly to a stimulative effect, but principally to the elimination of those small losses of time, and aggravating interruptions in the work, which result from inadequate illumination.

Fourth: In all of the efficiency tests conducted to date the highest level of illumination investigated has invariably shown the greatest production and the greatest economy. In fact, in the range considered, the relation of decreased production costs to total lighting costs is of the order of ten to one. Four such tests which were conducted in a thoroughly scientific manner under the supervision of Mr. W. A. Durgin show increases in production of ten to twenty-five per cent resulting from better lighting.¹

In addition to the Durgin tests noted above, there have been several other less complete investigations in various industries which have also indicated substantial gains from the liberal employment of properly designed illumination. It is evident, however, that the imperative need of the art is for a far greater number

¹A record of these tests was published in *Electrical Review*, Chicago, March 22, 1919.



Fig. 6. Correct Method of Office Lighting.

of exhaustive tests covering many industries, tests which not only establish the range over which illumination may be profitably increased for a given operation, but which are also carried to such a point of extremely high illumination that an actual decrease in economy is recorded, due to the increased production, if there is any, being insufficient to compensate for the added cost of the light. All of these needs seem so simple and so obvious that you are inclined to ask why hasn't all this been taken care of long ago. The answer is that those interested in the subject of scientific illumination have been men trained in designing better lighting systems, and in improving the efficiency of our lighting units. It is only through their efforts that artificial lighting comparable with daylight has become available and at a reasonable price. These men very properly look to those skilled in the science

of management to cooperate with them in solving the second part of the problem; that is, determining just what degree of illumination is desirable and profitable in a given industry. As Chairman of the Reciprocal Relations Committee of the Illuminating Engineering Society, I commend this subject to the serious consideration of the members of the Taylor Society, and assure you that if you see fit to inaugurate such tests in your plants or in the plants of your clients, to furnish you with the best technical advice on the design of the various lighting systems and the choice of equipment.

The following is a list of factors which have been found in previous tests to require particular attention:

1. The test should cover a considerable number of operators working in the test area, supplied with a uniform illumination.

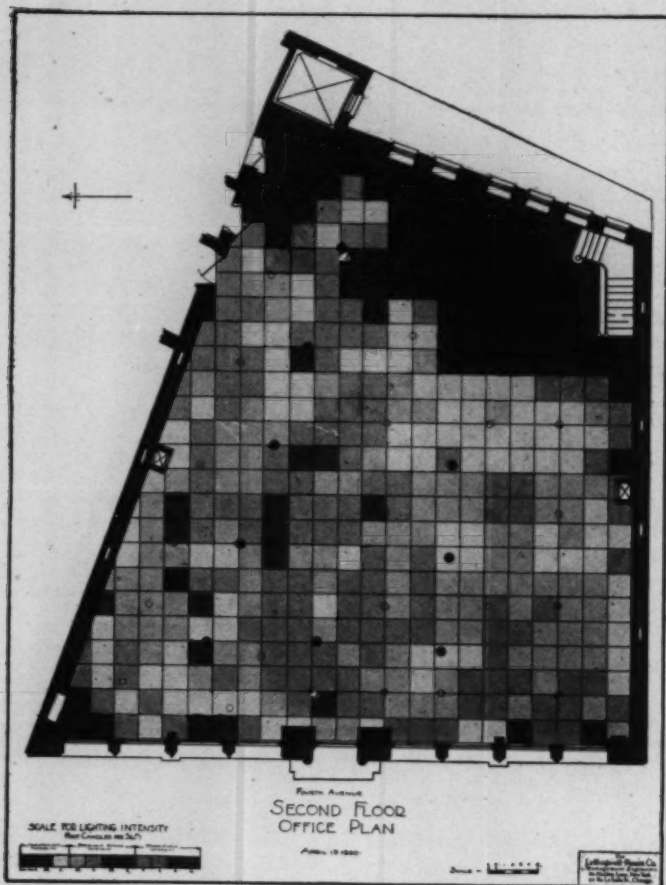


Fig. 7. See Fig. 8.

2. A separate work-sheet should be kept for each man
3. The humidity of the atmosphere, the time of the year, the days of the week, and days before and after holidays should all be closely noted, as any of these may cause a variation in production.

4. There should be a number of different illumination steps employed in the test. It is preferable to start with the original system, and check back on this original system several times, as well as to check production at least two times at each level. A check should also be kept on the daylight production when possible.

5. The material supplied the men should be closely inspected, for at this time especially many plants have considerable difficulty in securing their rough products; rough castings may one week require finishing down $\frac{1}{4}$ ", and the next week the shipment may have to be finished $\frac{3}{8}$ ".

6. It is desirable that a knowledge that test is under way be kept from the men when possible.

7. There should be a close supervision of the men at all times to see that they are all at work and to note any changes in personnel.

8. There should be a close check on the material supplied the men as well as the power supply, in order to note any shutdown from either of these causes.

9. Objection from the workmen is liable to be experienced when changing the size of lamps and reflectors, but this can largely be overcome by making all changes over the week-end.

10. The foot-candle illumination should be measured at the beginning and end of the hours under consideration as well as at certain intermediate hours. Definite stations should be located for these readings.

In addition to the illustrations of the foot-candle meter (Figs. 2 and 3), I submit herewith other illustrations, chiefly cases of good and poor illumination (Figs. 1 and 4 to 6).

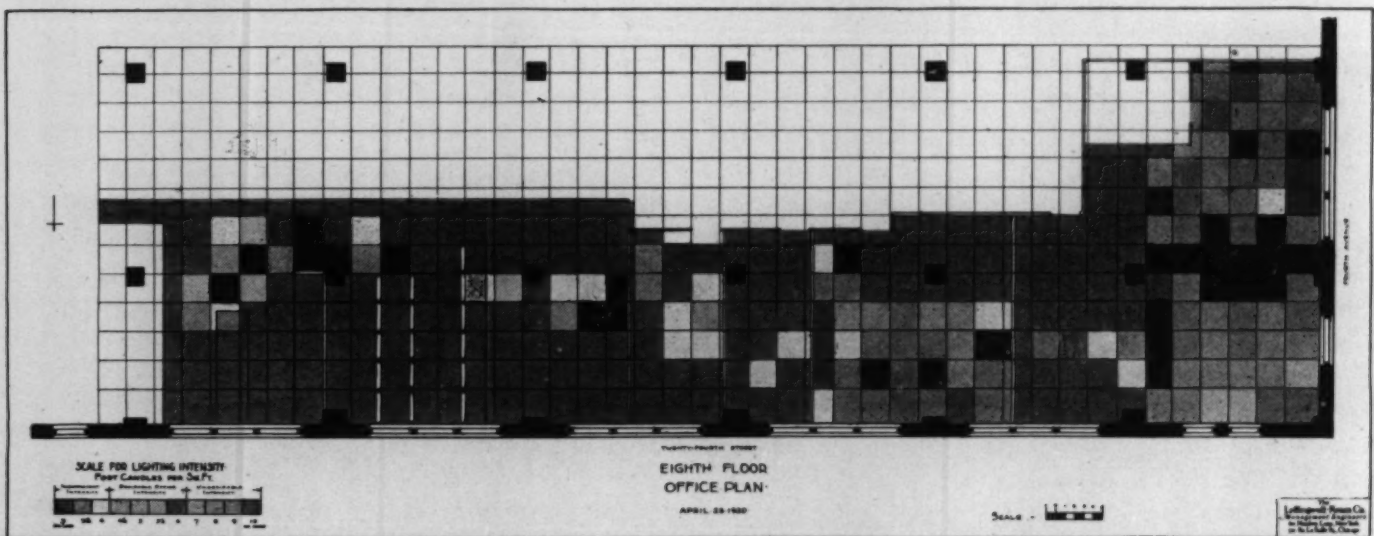


Fig. 8. Leffingwell-Ream Co. Method of Plotting Foot-Candles Intensity—Each Section Represents an Area of 1 Sq. Yd.

DISCUSSION

W. H. LEFFINGWELL:¹ I am not going to argue about Mr. Harrison's paper. Neither am I going to claim that I know anything about illuminating except what I have learned from the writings of illuminating engineers. The National Lamp Works gets out a number of bulletins such as "The Lighting of Offices and Draughting Rooms." I think that all members should make it a point to get such of those bulletins as may interest them.

Since the work of our firm is mostly in the office and most office work is very intense eye work, we have found this problem of lighting a very important one. The scientific measurement of light by means of the photometer is a difficult matter and for a long time there was no way that we knew anything about for finding out in a simple way what the lighting conditions are. The instrument that Mr. Harrison has shown us here is such a wonderfully simple one that I think almost any engineer who has any lighting problems cannot afford to be without it. It is of a very low price and it gives you a quick result.

What I have to offer tonight is what I think a little better method than is ordinarily used by the illuminating engineer for charting the lighting conditions.

The illumination engineer's diagram, it seems to me, is too technical and abstract for the average business man to understand. I am showing a typical diagram (curve) as used by illuminating engineers kindly loaned to me by the National X-Ray Reflector Company. You will note that the scale across the bottom indicates the number of feet from the center of the lighting unit while the vertical scale indicates the number of foot-candles. This form of charting is merely used to indicate the distribution of light in a typical bay. As a rule, unless one is considering an entirely new building where conditions can be standardized, only an average bay could be considered and thus this method fails to show the true conditions throughout the area.

Now our method, which was originated by our Mr. C. W. Griffin, a member of this Society is to make a pictorial diagram of the entire floor, dividing this floor into squares of one yard in area. We then make a test of the light in each square yard with the foot-candle meter, shown here by Mr. Harrison tonight. Then we color the chart with a range of several shades of three colors. Our scale, as shown at the bottom of the diagram shows three shades of blue as insufficient intensity and ranges from 3 to 4 candles. The desir-

able office intensity ranges from four-and-a-half to six foot-candles and is shown in four shades of yellow. The undesirable intensity we have shown in four shades ranging from pink to intense red and it indicates from seven to ten foot candles and over. The diagram is then colored throughout the entire area.

Figure 7 shows very good distribution of light for part of the area, but very poor in other parts. Figure 8 shows a very spotty condition—some places running down to less than three foot-candles and others as high as twenty foot-candles.

Mr. Harrison has shown us that we can profitably go much higher than we have shown on this scale. I have felt that any intensity above seven or eight foot candles is not necessary in the office chiefly because nearly all the work is on horizontal flat surfaces, but from the demonstration given us tonight I think perhaps I shall have to revise that opinion.

There are one or two things that I should like to say about office lighting particularly. Mr. Harrison showed one installation of the indirect lighting. In the diagram which I am passing around, which is very spotted, was used a semi-indirect, but the semi-indirect did not properly diffuse the lighting throughout the place, so it was supplemented with drop cords. This is the most common way of trying to make the lighting satisfactory and the reason is that these lighting problems are not handled by illuminating engineers, or engineers of any kind. Usually it is an electrician, and about all he knows is wiring and putting up the lamps.

I think it would pay any organization well to have their lighting problems examined by an illuminating engineer. The management engineer is not an illuminating engineer—he is a consulting engineer in management and lighting is only one of his problems. His work in this respect is merely to show the client whether or not the lighting he has is up to standard.

Another thing that I should like to mention, which Mr. Harrison only briefly touched upon, is the false economy of trying to estimate lighting from the standpoint of the cost of the current. Mr. Harrison pointed out that the cost of the lighting is only a very small percentage of the cost of the employee. If we can show by these tests which Mr. Harrison suggests that increased lighting is an economy, I think by all means we ought to do it, because sometimes the business man approaches these things only from the dollars and cents standpoint and not from the standpoint of trying to give his employees the very best working conditions.

¹Leffingwell-Ream Company, New York and Chicago.

PLANNING APPLIED TO ADMINISTRATION¹

by

J. WILLIAM SCHULZE²

PRELIMINARY to the discussion of the subject-matter of this paper, it may be well to dwell briefly upon two developments in the progress of scientific management which have an important bearing on our topic.

First, the real significance of scientific management is not yet understood by the general business public. Business men refer to it as the *Taylor system*. They look upon it as an aggregation of mechanical methods. The underlying philosophy—the simple principle of approaching scientifically *all* problems of business—seems not to have been grasped in any general way by the administrative officials in our business enterprises.

Second, the principles of scientific management seem to be regarded as applicable only to the factory or plant. That the principles which Mr. Taylor advocated are of as great force and of even greater importance in the administration of a business in all its activities, does not seem to be a matter which has been made sufficiently clear. I am speaking now of principles, not especially of planning boards, route sheets, instruction cards, and other mechanical devices.

There would be no occasion for a paper such as this, if these two tendencies away from the broader view of what we really mean by scientific management had not resulted in a misinterpretation of Mr. Taylor's philosophy and a too narrow application of its usefulness.

DEFINITIONS

The object of this discussion is to focus attention upon the administrative function of business. This leads immediately to a pertinent query. What is the administrative function? And this, in turn, opens up the whole subject of terminology, which cannot rightly be evaded in such a discussion.

What is management; organization; administration? What do we mean by scientific? What is planning? Only recently I heard no less an authority than Morris L. Cooke say that he did not know of an adequate definition for the term "engineer."

The term scientific management itself is restrictive unless we give the word management a broader meaning than it actually possesses.

If we would, as a group, promote the scientific method in the art of conducting business, is it not essential that we understand each other clearly when we use descriptive terms? Else how can we interpret them to others and be sure that some other member of the group will not the next day give them a different meaning? It does not seriously matter whether we call a thing by one name or by another, so long as everyone employs the same name as descriptive of the particular thing that is meant.

In recent issues of the Society's BULLETIN some attention was given to definitions of terms in articles by Harlow S. Person, Morris L. Cooke and the writer. While not desiring to launch any controversial subjects at this time, it seems desirable to set up the following conceptions upon which the subject matter of this paper is based:

"Scientific"—a process of applying analytical and synthetic reasoning to a proposition and to all available data concerning it; i. e., dividing a problem or a proposition into its component elements, reviewing them, improving them eliminating some, introducing others, and finally bringing the elements together again into a new program or method or product or conclusion.

The word "scientific," therefore, does not denote any particular system. It is a method, a process of reasoning upon the basis of facts as opposed to the process of coming to conclusions on the basis of precedent and snap judgment. This work of analyzing and synthesizing, it is true, may and should be done systematically, particularly in cases where the same kind of problem or set of conditions is repeatedly presented. But in no sense can it itself be regarded as a system.

"Administration"—the function of determining the objectives toward which an organization and its management are to strive, the facilities with which it is to work, and the governing policies and restrictions under which it must work.

"Organization"—a combination of the necessary human beings, materials, tools, equipment, working space and appurtenances, brought together in systematic and effective correlation, to accomplish some desired object.

"Management"—the function or force responsible for directly conducting the organization toward the objective set up for it, and keeping it within the governing policies imposed upon it by the administrative officials.

¹A paper presented at the Rochester, N. Y., meeting of the Taylor Society, May 7, 1920.

²T. William Schulze Co., New York.

"Planning"—the function of securing the data upon which objectives are based, of determining what facilities are necessary in order that the desired result may be accomplished, of assigning specific portions of the total task to specific members or parts of the organization, of examining the progress periodically to ascertain whether the accomplishment accords with the desired result, and of bringing to light the causes of discrepancy between actual and required accomplishment. Planning is part of the scientific procedure and, in turn, is itself subject to the scientific method.

Mr. Cooke in his article¹ suggests that the function of directing precedes that of administration. I have not yet been able to satisfy my own mind that directing is not a part of administration. Mr. Cooke also holds that planning might be set apart as a separate division, and it is entirely feasible, in my judgment, that the direction of the planning process be under the control of a central department.

But let me suggest, parenthetically, that the functions of administration, management, organizing and planning are not departments necessarily. They are present, or should be, in all the major departments of business.

If these definitions are even approximately correct, is it not logical to conclude that the word scientific should also be coupled with the term administration? And is not the administration of a business clearly a separate and, in fact, a vastly more important function than that of management?

No one can successfully confine the use of the word scientific to management only. I am sure that that could not have been Mr. Taylor's purpose. If it were, scientific management would simply have amounted to a label by which a certain set method of management is to be known; in other words, a system. And I am afraid that unless we are careful the word "scientific" may suffer the same fate that has overtaken the word "efficiency."

THE ADMINISTRATIVE SCOPE

It is obvious also that the planning function is not to be confined to the factory. Wherever a task is to be accomplished it comes into play. Indeed, its greatest and most important need lies in connection with establishing the task for the entire business and in coordinating the accomplishment of each branch or department with the common purpose of the enterprise.

Now a business has other things to do besides manufacturing goods, important though that function may be. It must sell them; it must provide finances; it must purchase. It must warehouse and distribute the finished product. It must handle a certain amount of

miscellaneous clerical routine. It must determine to what purpose the profits are to be put. It must look into the future and plan to harmonize the future course of the business with the tendencies in the world outside of its four walls.

Planning in the sense in which it is used here applies, or should apply, to all these activities. And it should apply to them collectively, as well as singly. In other words, it applies with emphasis to the administrative activities which, as we have said, comprise the direction of the complete business, both as to the future and in the present.

THE PRODUCTION FACTOR

Take the activities of the factory or plant in relation to the rest of the organization. From the standpoint of the entire business there are only three items of basic importance in respect to the plant; first, what shall be produced; second, how much shall be produced; third, what is the cost? Included *within* these there are the countless problems with which the factory administration and management must deal. No matter how far-reaching or how fundamental any one of them may be, their solution in the last analysis is interpretable in terms of nature and quantity of production and of cost. Not even the labor problem can be solved adequately without keeping in mind these basic resultants. Why? Because they affect the manufacturer's pocketbook? Partially but more particularly because they affect the public pocketbook and must, in turn, affect the worker's pocketbook.

In the manufacturing business all roads lead back to the factory. The size of the business is limited by the production capacity. There can be no doubt of that. Therefore, planning from the viewpoint of the administration of the entire business must start with this factor. And it is at this point that the Planning Department in a plant under scientific management should be capable of bringing its whole armament into focus upon the elements of production and cost, thus establishing the link between the factory and the other departments of the business.

I have in mind one case in particular, among several within my own experience, where, prior to the introduction of administrative planning, the plant was operated upon the basis of sales orders coming in from day to day notwithstanding the fact that the articles produced were standard, and were catalogued. The result in this case was that the factory was loaded with orders for a part of the line way beyond its capacity. Further, the orders for some of the numbers amounted

¹Bulletin of Taylor Society, Vol. IV, No. 5.

to as little as one-twentieth of one per cent of the total quantity of the branches of the line to which they belonged,—far too few to warrant the cost of setting up the necessary machines. Again, the nature of the product is such that, in order to come out whole the concern must produce a certain percentage of each grade, which was exactly what did not happen. Result: large accumulations of some of the grades, violent shortages of others, and a scramble every so often to dispose of excess stock by inducing the trade to permit substitutions and by reducing prices. The final straw was the institution of a rush list and the sending of men into the factory to force through items urgently needed. I need not go into details as to the confusion, high costs, low production and general unrest which such a procedure was bound to bring about.

Planning, as we understand it, contemplates that an estimate be prepared for three months, four months, six months, a year, as the case may be. Such estimates in concerns under traditional management are made in many cases. But they are usually guesses rather than estimates. It is required that this estimate be the result of carefully compiled data, that each component element be studied and scientifically assimilated. To take the records for past years and add a round percentage for normal increase is not enough. Each productive department must be analyzed. Available workers, equipment, materials, space, transportation, conditions, housing facilities, actual working time, tasks, bonuses, wages,—all these and other factors enter into production and cost and must be studied in advance if we are to plan scientifically; they must not be left to future development. Where a factory planning department is functioning properly, this data is quickly available.

A preliminary statement of factory capacity in as much detail as the circumstances may demand is prepared for the use of the administration, indicating what it can depend upon—barring adverse events beyond human control—from the standpoint of production and cost. This is the basis upon which all subsequent planning rests. It is evident, therefore, that it should be prepared with precision.

"But this is impossible in our plant," one may say. Would you permit your architect to build your house with an estimate less precise? Yet almost as many varied elements enter into the building of a house as enter into the manufacture of the average product. What of the contracts for building bridges, tunnels and the like under some of which the contractor is penalized up to as much as \$1,000 a day for every day's

delay beyond the allotted time and, of course, is held to the contract price?

It is true that under the present uncertain business conditions this planning and estimating is more difficult than it is in normal times. Yet it is being done to my knowledge successfully. The more uncertain the outlook, the greater the need for careful planning.

THE SALES FACTOR

Not until it knows what there is to sell can the administration of any sales department determine what effort will be necessary to sell it.

On the other hand, there can be no intelligent sales program without a scientific study of markets, sales people, advertising facilities, distribution agencies and the countless other factors which enter into the sales problem. The scientific method employed in the factory has equal force in the sales field. It is true that the problems are different in character and that engineering precision, in many cases, is out of the question. But the process can be carried profitably to a far more advanced stage than is the common custom.

Much has been said of the wastes of production in the plant. Would it surprise many of us if it were found that the wastes in selling were several times greater? I think not.

Appropriations for periodical advertising,—upon what actually known facts are they based? The millions of circulars distributed annually,—how carefully are they planned to reach the actual potential purchaser? The storerooms full of printed matter, display fixtures, dealers' helps and the like which were never even sent out to do their work,—what planning is done here to prevent waste or, what is even more important, to secure productive results from the money and effort spent?

Take the problem of selecting the channel of distribution. How many concerns can justify their policy of selling through the jobber or direct to the retailer, as the case may be, by actual facts and statistics taken from scientific study? Is it not true that most businesses follow the trade custom, fearing, rather than knowing, the consequences of a departure from it? Yet I have seen, as the result of common sense tests which could hardly even be dignified by the term "scientific," a sales policy successfully switched from the jobbing to the retail basis almost overnight—after over twenty years of debate on the basis of precedent and judgment.

On the other hand, I recall where a concern had both jobbers and retailers on its books. It became necessary to decide which should be dropped. A meeting

of the important executives was called and the matter was settled at that meeting purely on the basis of majority opinion. Not a single set of facts or statistics was produced beyond a comparison of the amount of business that had been received from each class of customers and a comparison of the number of customers in each group.

Then there is the problem of managing the salesman in the field. No experienced business man will deny the waste there is here. Mr. John M. Bruce, who has done so much valuable work in connection with this problem, has cited illustrations before this Society and elsewhere which are evidence enough of wasted effort in the selling field, if, indeed, any evidence were needed. It is clear that a considerable amount of time is wasted, to say nothing of the direct expense, because there is no planning in relation to market consumption, location of customers, condition of stocks on their shelves, transportation routes, available products for sale, coordination with advertising campaigns, etc. I have in mind several concerns which send their salesmen into the field two or three times a year with no other equipment than a line of samples, some specimens of advertising copy and display fixtures and a pad of order blanks. It is up to the salesman! As a matter of fact, in these cases the salesman controls the business. He decides what items to push, and naturally they are those which yield the largest commissions or make his records look big. He determines what new items shall go into the line and when they shall be dropped. He decides whether he shall see all the prospective customers in town or go to a baseball game.

The Associated Advertising Clubs of the World and other national and local bodies of advertising and sales managers are approaching these problems in painstaking and constructive fashion and have done noteworthy work in the field of research. At least one large publishing house, several progressive advertising agencies and a few professional sales consultants also have made valuable contributions to this work. The individual concerns which are likewise scientific are exceptions, however, rather than the rule.

Planning applied to the sales activity contemplates the preparation of estimates of sales in detail, estimates of expenses in detail, based upon scientific study of the component elements of the sales problem from the factory to the consumer. It comprehends the reconciliation between sales requirements, on the one hand, and factory productive capacity on the other, to the end that the sales departments may sell what the factories produce and the factories produce what the sales departments are able to sell.

It goes further and demands the application of the planning principle to the activities *within* the sales function. It is useless to prepare estimates and budgets unless the sales administration sets up internal planning machinery designed to distribute the task of making its plans come true. The advertising department should correlate its program and its appropriations to the plans of related departments. The assignment of sales tasks in detail to the branches and to the individual salesmen to fit the program, and the periodical supervision of their efforts to keep the ship pointed along the charted course, form part of the intelligently planned sales procedure. Even the sales correspondence, now left in many cases to the discretion of clerks with indifferent training and little vision, should be planned carefully to fulfil its real purpose in the general scheme.

THE STOCK DISTRIBUTION FACTOR

In a business with branches established at various market centres throughout the world, the problem of maintaining stocks sufficient to fill the orders which flow in, and yet not so large as to cause a drain on finances, or to run the risk of depreciation in value as a result of deterioration or change in style, is of great importance.

The common procedure is to establish maximum and minimum stocks on the basis of previous sales records. The result is an inflexibility which sometimes is extremely costly. A sales drive brings in a larger volume than usual and the stock is not there to meet it. If the branch is located many miles from the source of supply it is obvious that the delay in replenishing stock is a matter of considerable annoyance, causing cancellations and the consequent waste of sales effort.

Another method in common practice is to place the responsibility for distributing the finished product directly upon a central merchandise manager or warehouse manager at the home office. He in turn carefully watches the current sales sheet and the urgent requests by cable, telegram and otherwise which come from the branch managers, and sits in judgment upon the evidence before him. Conflicts and injustices are almost certain to occur, no matter how carefully he does his work. A rapidly selling article will be demanded by several of the branches, the total requirements being in excess of the supply. The branch managers cannot be convinced that they have had their share, particularly if their remuneration is dependent on their sales.

I have found that under this arrangement it also happens almost invariably that when the busy season

arrives, as, for example, the Christmas trade, the stocks for branches located at a distance from the plant are inadequate, while the production coming through during the last week or two of the year increases local stocks excessively. It seems to be too much to expect the person in control of stock movements to resist the importunities of local branch managers who have the opportunity to make their appeals in person and who, therefore, are able to establish a more intimate personal relationship. The result is that they are often able to influence goods to their shelves early in the season, which should go to the far-off branches.

With a production program, on the one hand, and a sales program, on the other, there is little room for inequalities of this character. The warehousing function under an administration based upon the principle of scientific planning is planned to coordinate with both production and sales. The product manufactured each month is distributed in accordance with a predetermined plan so that the branch manager in San Francisco, or in London, will be able to compare his receipts, not with what he thinks is just, but with the schedule upon which he depends in conducting his operations. This schedule he knows is official. He knows it was planned months previously. He knows it is the result of careful coordination of all the influences affecting it. And if it was properly prepared, he knows that he had his opportunity to assist in its preparation and to present his case before it was adopted, if he at that time considered it ill-suited to the requirements of his branch.

The merchandise or warehouse manager, at the central point of distribution, is controlled not primarily by expediency from day to day, but by a well-rounded plan. He is guided by actual receipts from the factories compared with schedule. Shortages are distributed pro rata, all other things being equal; likewise, arrearages. And his efficiency is measured by the success with which he actually distributes the finished product in accordance with the predetermined plan. There can be no question of mal-distribution under such planning.

THE FINANCIAL FACTOR

It must be obvious from what has been said that if the planning is carried to a point where it covers the factory, sales and warehousing activities, it becomes largely a matter of simple mathematics to carry it further to cover the financial aspects of a business. Indeed, when this is done along with the rest of the planning, it sometimes becomes necessary to revise the

factory or sales plans to bring them within the financial capacity. Eagerness to expand must be tempered with conservatism on the part of the financial officials. It is lack of planning at exactly this point which is generally responsible for failures due to over-expansion. The Westinghouse case some years ago has been cited by financial writers as a classical case in point.

When it is known what goods are to be produced in detail, what they are to cost, when and how they are to be sold, what the planned sales and advertising expenses are to be, what the clerical departments will cost, etc., it is comparatively easy to prepare plans or budgets of income and expense and of cash receipts and outlays. The procedure is to prepare what might be called "a predetermined profit and loss statement" and "a predetermined balance sheet." These two statements indicate what the resultant effect upon the prosperity of the business will be, if all the plans upon which they are based are carried out. In this connection, let us not forget that this is the end toward which, in a business enterprise, we must strive; that is to say, to maintain and improve the prosperous condition of the business. Upon that economic principle rest the stability and welfare of the body politic.

With such a carefully defined goal set up, it has been my experience that the administrative officials will bend their energies to the task of bringing to an actuality the planned results. They no longer show more than a passing interest in last year's results. These are useful chiefly from an historical point of view. The real operating basis is comparison with the standards set up for *this* year.

A rather peculiar effect of this kind of planning comes to my mind. The principals in this case were self-made men who had built up a substantial business out of profits. They were afraid of letting Wall Street get control. They did borrow from the banks on current notes to meet the seasonal requirements. On the other hand, as the business expanded and their loan requirements became heavier and heavier, their nervousness increased. Prior to the establishment of planning schedules, the topic which caused most concern and most of the discussions and investigations was this question of outstanding paper. After the schedules went into effect and were properly functioning, the loan issue became a dead letter, although borrowings practically doubled in two years. Whenever the amount looked big, a comparison with the schedule of what it should be answered the doubt immediately.

The financial official in arranging for his bank balances, discounting of notes, flotation of securities, etc.,

goes about his work with considerably more security when he is fortified by such planning.

As in the case of the factory and the sales department, detailed internal plans are prepared within the financial department for the guidance of the collection procedure, supervision over loans, payments, etc.

THE PROFIT FACTOR

Such planning as has been described here leads to a clear definition of the amount of profit anticipated, toward which the entire organization is striving. But simply thus to define the goal is not enough.

The objectives of the administration get down concretely to two resultants; profits and the concern's financial condition. These two are by no means always in harmony. An attempt to increase profits unduly may bring with it financial embarrassment. Hence, in the consideration of the profit a business plans to make, it is quite as important that the plans be laid with a view toward keeping profits within proper limits as it is to attempt to earn all the profits which the traffic will bear.

Planning with respect to profit should go farther than this. It should include what disposition is to be made of the planned profits.

It is not unlikely that much of the present unrest is directly traceable to the failure on the part of administrative officials to include in such planning as has been done a distribution of the profits in accordance with a plan that is demonstrably equitable.

Here, of course, enter some rather delicate questions in which the whole industrial world just now is earnestly interested. It is not part of the purpose of this paper to advocate any particular scheme of profit-sharing or employee relationship. It is desired to point out, however, that the profits of a business equitably belong to three sets of people: to the investor, to the worker, and to the public. Just what share belongs to each is a matter for careful determination by the administration and the employees of any given concern. By far the best plan is to let the employees settle it themselves as they did in the case of the Denison Manufacturing Company. But it should be decided. And it should be decided beforehand as a matter of good business and as a matter of planning. Moreover, it should be a matter of "open covenants openly arrived at." That is to say, the organization should understand that the object for which it strives is profit, but that this profit will be divided; so much for the investors who are entitled to a fair return on their capital, plus payment for the risk they take; so much for the workers who are entitled to a fair basic wage, plus an additional share in the result of their

labor, consistent with the fact that their capital, which is bound up with their lease of life, constantly undergoes a process of exhaustion; and so much for other purposes such as research, invention, reduction of prices, improvements of quality, etc.

Capital is, or is the token of, a physical thing, and, assuming that a business is profitable, continues to exist beyond the lives of individuals. Those who own it and decide to devote it to this or that productive enterprise are entitled to payment for its use and payment for their risk. The individual worker lives, let us say, his allotted three score and ten. A basic wage to cover the mere cost of living is not enough. On the basis of pure, cold-blooded bargaining, such as has been applied to the capital end of the argument, he also is entitled to an additional payment for the depreciation which takes place in his earning ability as years in his case multiply.

As for the public, which usually is left dangling between the two, there is also something to be said. To my mind it is best said by quoting a notice sent out to dairymen by a certain large milk company some months ago and by characterizing this action as short-sighted, as well as unjust, not to say uneconomic:

The export market of milk products has entirely stopped. It is, therefore, necessary that we restrict our purchase of milk. Under no circumstances can any creamery take on an additional dairy without first getting permission from this office, and permission will not be granted for new dairies until conditions change.

All dairymen are urged not to increase their production of milk, and if possible to decrease it.

This at a time when prices of milk were inordinately high and when the President of the National Manufacturers' Association had advocated a concerted effort on the part of manufacturers to reduce prices twenty-five per cent instead of meeting the inevitable wage increases. Another company raises its price of collars to thirty cents when its reports show an increase in profits from \$1,871,000 in 1918 to \$5,153,000 in 1919 and an increase in percentage on capital from 7.5 to 20; and these are not isolated cases. The argument here is not based merely upon the ethics of the procedure, but just as forcibly upon the fact that it is unscientific and uneconomic. The administrative officials of these concerns are laying themselves open to the charge of incompetency if we judge them from a point of view that looks beyond the present. They are not building soundly or in a big way.

PLANNING WITH RESPECT TO FUTURE DEVELOPMENT

Beyond the current year's profits lie those of future years which call for planning of an even broader character than that which we have been discussing.

The world is a big place and the opportunities for expansion are unlimited. But the field must be studied. Factors of an economic, political, geographical, sociological, financial and physical character enter into the problem. If we would build a business soundly as well as profitably, it is necessary that our plans be laid not only with respect to conditions as they are today, but more particularly with respect to what they are likely to be in the future. Otherwise we may find ourselves some day with a lop-sided organization on our hands while a competitor walks away from us, particularly a foreign competitor.

The much-quoted, supposed saying of Von Moltke, when he was awakened the night of the declaration of the Franco-Prussian war, still holds good: "The plans are in the drawer of my table." What are the probabilities with respect to taxation, foreign trade, inflation of credit, supplies of raw material, labor situation, political situation, merchant marine, profit sharing and so on down a rather long list? It is not meant that men must necessarily be prophets. It is suggested, however, that these matters should be studied in advance, on the basis of intelligently gathered and carefully analyzed data, and that plans be laid providing at least for a course of action in the event that this or that combination of events happens. Von Moltke did not *know* that there would be a Franco-Prussian war. the liquor-dealers did not *know* that prohibition would become a fact; yet some of those who studied what was going on were prepared; the majority were not.

It would be possible to cite a number of concrete cases in this connection also. For example, there is one concern, let us say in the shoe business, whose chief source of supply depends solely upon the personal relationship of the heads of two concerns. It is almost a foregone conclusion that upon the death of one of them there will be serious trouble. Even in this case, with a knowledge of the possibility, no plans have been made to provide for the contingency.

I know of another case where a manufacturing concern's output is gradually being completely absorbed by a distributing concern and sold under the buyer's trademark and name. I happen also to know that in this case the buyer is planning to build a factory to produce his own product while the manufacturer is making no plans to protect himself.

PLANNING SCHEDULES

The result of planning, such as we have been discussing, is the preparation of a series of schedules, each intended to serve as a guide for some part of the or-

ganization or for some function of the organization. These schedules are prepared, of course, after all of the work of adjustment and coordination between conflicting departmental plans has been done. They would naturally vary with different concerns.

The following list is offered merely as an example of the general character of such schedules:

FACTORY

1. Schedule of weekly or monthly production quantities divided into basic classes of product.
2. Schedule of costs per unit and total, corresponding with the above.
3. Schedule of cash outlays for payroll, new equipment, purchases and expenses.
4. Departmental and miscellaneous schedules, harmonizing with the three main schedules just mentioned.
 - a. Departmental production quantities.
 - b. Bills of material to be purchased.
 - c. Number of workers planned, etc., etc.
 - d. Equipment to be purchased.

SALES

1. Schedules of weekly or monthly sales, in units and in dollars, of each class of product for each branch.
2. Schedule of advertising appropriations distributed monthly.
3. Schedule of monthly sales expenses by departments and branches.
4. Internal departmental and miscellaneous schedules; for example,
 - a. Allotment of sales geographically.
 - b. Allotment of sales to individual salesmen.
 - c. Allotment of sales to individual customers.
 - d. Layout of advertising campaigns.
 - e. Allotment of sales and expenses to Mail-order Department, etc., etc.
 - f. Departmental expense budgets.

WAREHOUSE

1. Schedule of weekly or monthly receipts from factories.
2. Schedule of monthly allotments to branches or warehouses based upon sales schedules and transportation factor.
3. Schedules of anticipated stocks at each branch or warehouse at the end of each month.

FINANCIAL

1. Schedule of monthly cash receipts and expenditures.
2. Schedule of anticipated monthly borrowings, loan liquidations, loans outstanding and bank balances.
3. Monthly schedules of profit and loss for each department and branch.
4. Detailed Collection Department schedule calling for monthly collections, based upon sales and terms of credit.

FUTURE DEVELOPMENT

Detailed plans covering

1. Expansion
2. Foreign
3. Personnel
4. New Lines
5. Distribution
6. Organization
7. Financing
8. Miscellaneous

MISCELLANEOUS

1. Schedules of purchases.
2. Departmental expense budgets.
3. Profit Distribution Schedule.

Most of these schedules, of course, are capable of summarization into a simple budget of profit and loss, and a budgeted balance sheet for the use of administrative officials in observing the gradual progress of the business in perspective.

Naturally, also, the reports of actual accomplishment from time to time are prepared so as to indicate the comparison of results with plans.

CONCLUSION

The chart which is in your hands (Chart 1) is an attempt to illustrate, in somewhat condensed form, the administrative planning procedure which I have been discussing. I should like to call your attention particularly to what seem to me to be the three essential features:

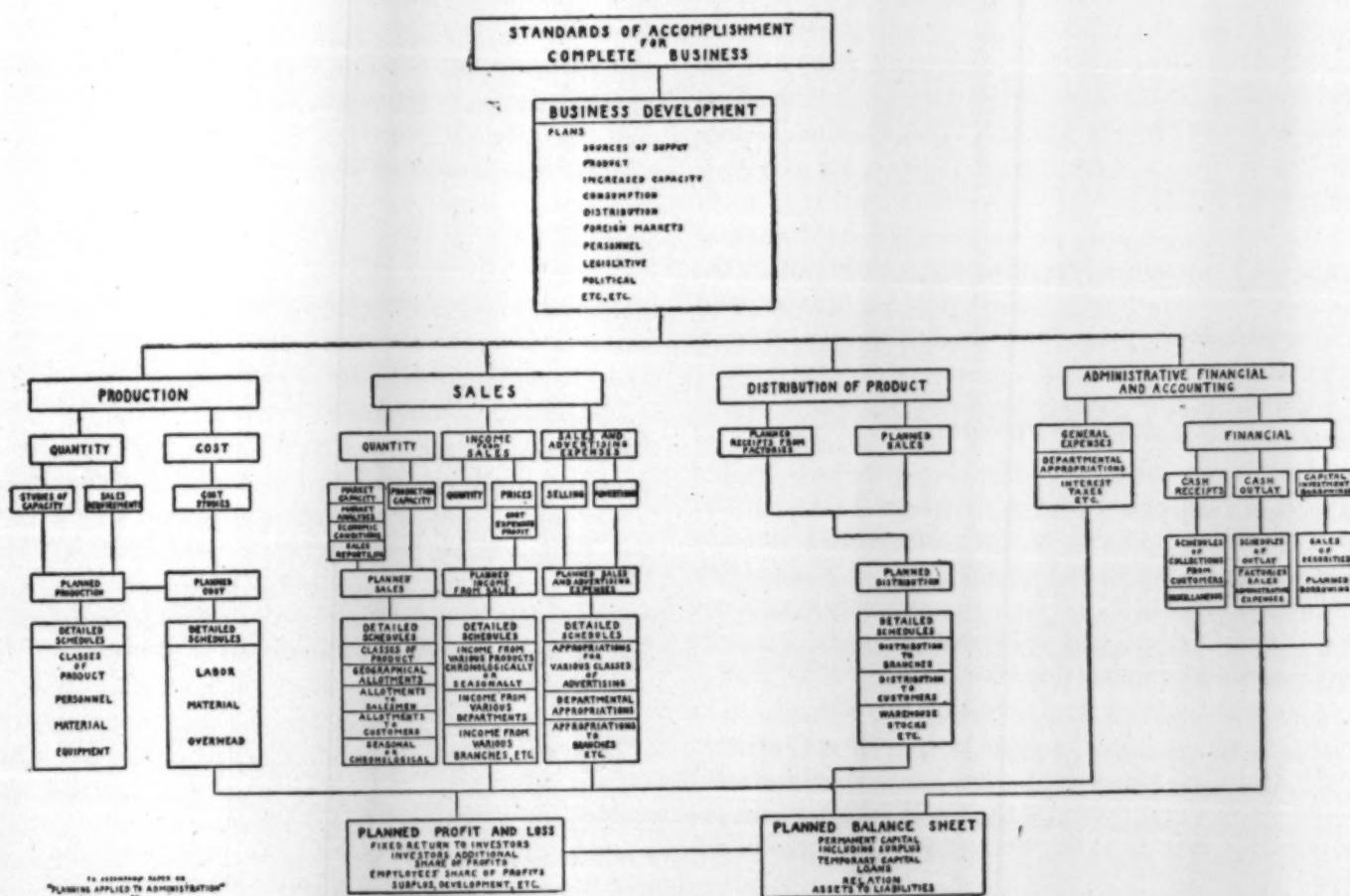
First: The coordination between the future plans and policies of the business, on the one hand, and the current operation of the business on the other. This is represented by the subordinate and dependent position of the operating plans to the panel at the top labeled "Business Development."

Second: The close inter-functional relationship between the operating plans. For example, "Planned Production" is shown to depend, in part, upon "Sales Requirements," while "Planned Sales," in turn, is shown to depend in part upon "Production Capacity." Every plan is dependent upon some other plan. The necessity for intensive administrative planning at once becomes obvious.

Third: The two objectives of the business in concrete terms are shown to be profits and financial stability. Administrative planning must definitely lead to these two goals; whether large or small profits are planned, whether or not outside financing is to be done, how the profits are to be distributed, etc., are subjects really outside of the scope of this paper. The point to be emphasized here is that the administration of any business is not fulfilling its function until it has planned or scheduled or budgeted (whatever term you choose to use) toward these two definite objectives.

I am aware that it would be desirable to present data from my files demonstrating the results that have been

CHART I
ADMINISTRATIVE PLANNING



achieved from the actual application of the principles here advocated. This I am not at liberty to do without disguising the facts and figures so as to prevent identification of particular concerns. Such data would be no more convincing than my unsupported statement, and I have no hesitancy in making the statement that in the cases with which I have had more or less intimate contact, the tangible results in increased profits and stronger financial position have been worth the price many times over.

On the other hand, I do not wish to convey the impression that the procedure outlined has been carried out completely in any one of the cases I have in mind. In a measure I have been discussing a composite picture. All of the features have been tested, some here and some there. In at least one case the program has been carried almost to its limit but not quite. The chief missing element in this concern is the detailed planning covering future developments.

In conclusion, it may be well to emphasize the need for caution and patience in installing a far-reaching program such as this. It is a long process, calls for careful, painstaking education, and demands plenty of tact and back-bone. The first attempt usually is crude and meets opposition. The essential requirement is carefully compiled data.

Nor is the purpose aimed at the establishment of the millennium. Plans and budgets will not themselves bring about the results sought. What has been accomplished is nothing more than the setting up of standards, not for one part of the business but for all parts of the business as well as for the entire business as a unit. It is the most important duty resting upon the shoulders of the administrative force. It then becomes management's duty to direct the business in accordance with these standards.

DISCUSSION

MORRIS L. COOKE¹: The idea conveyed by the title of this paper is certainly a vital one. Any suggestion which tends to enlarge our conception of industry and makes us realize the possibility of a more highly developed organization for the accomplishment of social and business and industrial purposes, is to be welcomed. The author deserves our unqualified thanks for his insistence on the necessity for definitions in management, and for the pains he has taken to provide some tentative suggestions. He has certainly started us to think about definitions, even if in a way he has started our inquiry at the wrong end. He seeks to de-

fine organization, administration, management and other rather inclusive terms almost before we have any of their constituent elements defined. Definition presupposes some degree of standardization.

The paper impresses me as being in some respects badly scaled. The objectives of industry are not in my opinion, "profits and financial stability." We can imagine a single plant, an industrial community and even an entire industry, enjoying both profits and financial stability and even so being a menace to social progress. A single patent right might bring profits and financial stability and bring nothing else of social or permanent value. Again, the author says, "We are interested in: first, what shall be produced; second, in what quantity; third, at what cost." More and more we management engineers voice the public viewpoint in asking, even more insistently, "How shall it be produced? What influence does the method of its production have on social progress?"

Our profession, that of management engineering, has come of age at a time when the interests of society and not the interests of individuals is the master test. This is one advantage which our profession has over all others, and it carries with it a very deep significance. The author's conception of industry seems to me too narrow to leave much room really for the function of administration, as I see it. There can be no more philosophical basis for removing the obvious details of sales management from the field of management and making them a part of administration than for withdrawing the details of shop management therefrom; order of work, routing, time study, standardization, etc., are essentially alike whether applied to a sales force or a shop force. The fact that the average salesman attends a few more ball games in a given year than does the average machinist proves nothing.

The author is undoubtedly correct when he says that the man on the street thinks of scientific management as something applicable to the shop rather than to the office. This is only natural in view of the fact that Taylor in his writings drew practically all his illustrations from the shop and most of these from the machine shop. I dare say few in this audience know that he subjected even bookkeeping to the analysis of time study, and set tasks on all kinds of office work.

However, I do not share Mr. Schulze's apprehension in regard to the name scientific management, and what may happen to it. The word "efficiency" has suffered principally because it is an all-inclusive term which lends itself too readily to the necessities of the moment. Efficiency has been all things to all men. It has come into disrepute not so much because it became the

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synonym for an unrealizable ideal, as because it spelled "bunk" in too many lines and lives.

Herein lies the value of the heritage of the Taylor Society. Both scientific management and the Taylor System have an established and world-wide status largely because of the definition of aim and method, and even more particularly because of results which can be measured arithmetically, if you like. We seek to be efficient, of course, but so do all wise men and women, just as they aspire to be good and to be happy.

It is no denial of the aim to be efficient or disparagement of the so-called efficiency movement to call attention to our somewhat narrower technique. We narrow and limit our technique only in order to secure such definition and precision as is requisite for the upbuilding of any science. The dangers in any such policy are obvious and inherent. We have so far avoided creating a cult. To continue to guard against such a development is simply one of the responsibilities of the future.

Other things being equal, we can afford to use mechanisms tried in the fire of years of experience rather than invent something just as good, even if here and there we have hurled at us sly references to Mrs. Eddy, and other standard fetishes. This leads me to hope that when this paper is printed, the quotation marks will be omitted when used around scientific management and the Taylor System. Membership in this Society assumes that we recognize in these terms the symbols not only of a very inclusive industrial philosophy, with implications and applications reaching beyond the world of industry, but of a master industrial technique through which and out of which the structure of the industry of the future will be developed.

We do not, of course, believe in the mechanisms and principles and philosophy of scientific management because they are unchanging and unchangeable. We could not be scientists and hold any such view. All we ask is that, so far as practicable, change and progress be build on the best that has already been done. We suggest, especially to young men, that they struggle to acquaint themselves with the basic and far-reaching and definitive technology of management known the world over as Taylor System; to attach themselves to it as to a going concern; to contribute to and improve what is, rather than to adopt the easier but altogether unscientific and ultimately unsatisfactory plan of seeking too much originality, especially at the start.

It will be obvious from this that I do not sympathize

with the author's efforts to have the term "science in industry" supersede the terms Taylor System and scientific management. The terms are obviously not synonymous. It will probably make for progress in industry to use all three of these terms. They each have a place and a significance of their own.

I hope I have made it clear that whenever the practices under either the Taylor System, or scientific management, are demonstrated to be unscientific or otherwise in violation of the laws of social progress, they are wrong, no matter who started them and no matter how fundamental they have been considered. But if the present chaos in industry is ultimately to be superseded by some measure of order, it will not be because of orators or demagogues or stand-patters, but because at first here and there and then gradually over the whole industrial field a definite technique or science of management is developed.

This is an age-long process. To it, however, Taylor was instrumental in making a contribution which is one of the few outstanding landmarks in the whole history of industry. It is well constantly to remind ourselves that the principles and philosophy of scientific management grew out of an industrial *practice* which is one of the first objects of this Society to publish to all the world. We stand for the maximum of science in industry. But as one of the very best means of accomplishing this end, we stand four square for scientific management and for the Taylor System, which is the way that many people prefer to name it.

In our discussions as to what constitutes administration, it seems very difficult to get away from a departmentalized scheme of industrial activity. We management specialists who have come to believe in the necessity for functionalized foremanship should insist on functionalized administration. But when we do so sub-divide the function of administration, we shall be apt to discover that much that we have been tempted to consider as administration falls into categories that differ in no essential respect from those we are familiar with in management.

It has always seemed to me that one criterion of judgment in distinguishing between management and administration in that the length of view, the long look ahead, constitutes the earmark of the administrative act. If this is so, then we have very little that is strictly administrative in industrial enterprise as it is practised in this country today. Even our captains of industry spend most of their energy on short-time problems and late-afternoon worries. I am of the opinion that the administrative function is yet to be

born, and nothing will foster the development of true administration more than the introduction of scientific management into industry. May I suggest that if we had any real conception of the function of administration, industry as a whole would long since have successfully grappled with the problem of unemployment within employment. What is the use of claiming to be an administrator if one stands baffled in the face of such a prolific source of human suffering and economic waste?

Mr. Schulze mentioned the work of one publishing concern. I imagine that he had in mind the Curtis Publishing Company. I have always felt that the conduct of their advertising policy comes as near being an administrative function as any of which I have knowledge. For instance, if an advertiser plans to advertise with the Curtis Publishing Company and makes the request, the company will send experts—and they are experts—to make an analysis of that business, report on its future—immediate future and distant future—and then advise as to whether the prospective advertiser is warranted in entering upon an advertising campaign and if so, what kind. And some of those analyses—which are rendered free of charge, I understand—have led to the revolutionizing of the businesses that were analyzed.

They have various other practices of that general character which have no immediate effect upon the conduct of their business, but out of them largely their success has been built. Many such practices of course have the effect of lowering immediate profits. But the long-range effect is to increase their standing in the community and increase profits.

If we have administration, the more there is planning in connection with it the better it will be; but until we are adequately planning for the functions usually considered to belong to the management, it is just words, in my opinion, to talk about planning applied to administration.

HORACE B. DRURY¹: The central theme in Mr. Schulze's paper would seem to be this: that, just as Mr. Taylor and the various other persons interested in scientific management have maintained that management should be planned, so planning should likewise be extended to administration.

To make clear the meaning of this proposition, Mr. Schulze has formulated definitions of management and of administration. It is always a difficult thing to make a definition, and it is still more difficult to get the world at large to accept a definition. Quite possibly the dis-

tinction that has been drawn in the paper today cannot be made to hold; the words are a good deal alike. Yet I think that we all get the connotation of the two words as Mr. Schulze has explained them, and understand what he means by them. An administrator is a man who rules, a man who is to a very great extent his own boss, who decides what is to be done—as Mr. Schulze says, decides what is to be made, and how much of it—things of that sort. A manager, on the other hand, is a man who has been given something to do, who is supposed to carry out instructions, who takes the responsibility for seeing that certain tasks are accomplished.

Mr. Schulze says that the wastes arising out of bad administration are greater than the wastes arising out of bad management; or, at least, that very great saving would result from a more careful planning as to what is to be done, and how, in a general way, the thing is to be attempted. It should be noted in passing that Mr. Schulze does not in his paper confine himself strictly to a discussion of administration as he has defined it. For instance, a number of things that he has to say with regard to the improvement of selling methods are really matters of management rather than of administration. The use that is put to circulars, the various methods of control of salesmen, etc., are not functions that concern the general scope of a business.

Nevertheless, I think that we will all agree with Mr. Schulze that anything that can be done to make the purely administrative functions of a business better planned is all gain; that any thought that can be given to making the central administrative function better understood and more clearly and logically developed should be warmly welcomed. The only question that could exist in any of our minds is how planning can be extended to this larger administrative function. As far as I can see Mr. Schulze has not in his paper advanced any very definite idea as to how planning can be extended to administration, as opposed to management. The chief thing that he has had to say on this point has been that data of various sorts should be gathered that will aid the administrator in knowing how he shall carry on his business; data with regard to production and with regard to selling, with regard to stock, finances, and things of that sort.

Now the gathering of information is at the bottom of all scientific method. But it is my understanding that when members of the Taylor Society speak of planning they have in mind something more than merely the gathering of information with regard to management. Back of the idea of planning, as scientific man-

¹Special Expert, U. S. Shipping Board, Washington, D. C.

agement uses the word, there is the idea of a definite system—not necessarily this particular system or that—but the idea of doing things in a systematic way,—setting up standards, very carefully coordinating all the factors that enter into operations, etc. That is the sort of thing that we mean by planning when we speak of planning under scientific management.

I doubt very much if it is possible to apply planning, in the rather technical sense in which the Taylor Society uses the word, to administration, in the sense in which Mr. Schulze uses it. And for this very simple reason: that as soon as you apply planning to administration, it ceases to be administration and becomes management. That is, you cannot reduce administration to a formula; as soon as you do, it is then carried on under instructions or in accordance with some definite policy and has become what Mr. Schulze would call management.

I think that the real thing that Mr. Schulze is urging in this paper, and it is an aim with which I am wholly in accord, is to extend the scope of management so as to cover some things that are now regarded as administration. That is, plan your selling, plan the relationship between stock and finished product, plan finances, and other things of that sort. Some of these things are already included under scientific management. But to a greater and greater extent the field of administration should be broken into, and this part of it or that reduced to an exact science. As I see it, however, there will be left that uncertain and unworked field, which now properly belongs to the administrator, who has to do the best that he can.

I want to add just one positive suggestion. If we are going to extend the field of planning, if we are going to control definitely these factors of sales, finance, employment and the other things of that sort that now cause so much uncertainty and loss, the way out will be largely through the development of organizations or understandings that are larger than business organizations as they now exist. Much of this work of coordination could be carried on by associations of one sort or another, dealing with the various problems of employment, production, sales, etc, for an entire industry or several industries. If to a wide measure of voluntary cooperation along these lines there could be added a certain amount of Government assistance and sanction, it would seem to me that it might be possible to reduce to exact scientific control many of what now appear as the perennial and insoluble problems of administration.

HENRY W. SHELTON¹: Mr. Schulze obviously believes in task-setting—for the business as a whole as well as for individual jobs. His main contention that planning is needed in the general as well as in the detail problems of a business is hardly open to an argument, and I think he has performed a service in calling attention to the need of a broader and more consistent application of the scientific method.

His definitions are painstaking. I agree with his general conception of administration. I object, however, to the concept of organization as "a combination . . . of human beings, materials, tools, equipment, working space, and appurtenances . . ." You can group inanimate objects, but you cannot organize them. Organization is possible only where there is life in the component parts, which, by their own powers of selection, choice and adaptation, are able to contribute to the life of the whole. I would therefore ask Mr. Schulze to consider amending his definition to permit this vital distinction. There is some question in my mind also, whether "planning" should be made so broad in scope as to include the judging of results, or whether the determination of the success and importance of results is not a separate function, which might be given some such term as "rating."

The spirit and frankness with which Mr. Schulze deals with "The Profit Factor" is admirable. I only trust that no one will confuse "capital" and "capital stock," or apply what he says about "capital" in its true sense to "capital stock" in the way the financier and promoter are sometimes tempted to apply it. True capital is, he says, a physical thing—but that cannot be said of what is represented by many certificates of ownership!

On the whole, Mr. Schulze has so successfully kept off of controversial ground, that I am led to wish he had been more venturesome. He has clearly told us what should be done. But he has not told us how it should be done, or who should do it. By implication the *modus operandi* of planning in administration can well be left to the professional advisor. In analyzing the need and defining the field of planning, he has left us to guess at the division of responsibilities of the workers in that field, and the kinds and extent of participation of the various parties at interest. The fine spirit in which Mr. Schulze would approach these vital problems, had he undertaken to do so, I believe is indicated in his statement that the division of the profits "should be a matter of open covenants openly ar—

¹Consulting Engineer in Management, Philadelphia, Pa.

rived at." Complete openness is indeed the sunshine of a business organization, bringing health and vitality.

Mr. Schulze says: "The objectives of the business in concrete terms are shown to be profits and financial stability. Administrative planning must definitely lead to these two goals." This statement is perhaps the most open to adverse criticism. He has confused the objective with one of the means of measuring progress towards the objective. Business is organized human effort for the satisfaction of human wants. The primary human want is growth, with freedom to express, i. e. "press out" that which is within. It is because of this inner urge for outer expression of life in ever greater variety and fullness that man finds joy in exerting his labor on nature for the production of goods and services. The profit shown on the balance sheet and income account is only a way of measuring the success of man's efforts in the mastery of natural forces. It can never measure the goal of man's own happiness and satisfaction.

His statement, taken at its face value, would indicate a dangerous and essentially destructive philosophy which I know Mr. Schulze does not hold. I point it out because I am sure he does not want to be misinterpreted on such a vital matter. It is because business has been run with profit as its objective, and has ignored its primary purpose of expanding the life of every participant, that industrial conditions and strife have reached the acute stage in which we find them today.

We members of the Taylor Society are human beings searching for the truth and its expression. As I look back over our various meetings, it seems clear that many of our most heated discussions have been the most productive of our healthy growth. Let us, then, be willing — even eager — to enter upon controversial ground, if by so doing we can get closer to and help clear up the fundamentals.

DWIGHT T. FARNHAM¹: As a preface to a question I should like to ask Mr. Schulze, I should like to say that while I was in Chicago last week, I was talking with a man who is president of a large coal company, who for about four years has been carrying out very carefully what Mr. Schulze has described. For some years he has been running a graph with which he plans the profits to be realized in his coal business. We all know that the coal business is very uncertain, and especially has been so during the last few years.

¹Consulting Engineer, St. Louis.

In spite of such conditions, however, this man has been carrying one curve in black which gives the standard profit, and following that month by month with a curve in red showing the actual profit; and those two curves have run unbelievably close to each other. He even goes to one of the large Chicago banks and does his financing on the basis of a curve showing the predicted seasonal income and expenditure. Altogether he is carrying out in a very practical way just what Mr. Schulze has described.

The question I want to ask Mr. Schulze is, whether he has two headings in his graph at the right hand side — quantity and cost? In his talk he also mentioned what you make, or the nature of the product. I would like to ask whether he includes under such things as quality, the organization of the inspection department, the establishment of standards of quality in which possibly the sales department, the laboratory, or the factory would get together and decide upon what is a proper quality for the customer to be asked to accept?

CARL G. BARTH¹: It appears that Mr. Schulze has in mind carrying the scheme of analyzing, planning and functionalizing the duties and work of an organization much further than anybody has thought of doing heretofore. He at least suggests the possibility of going much further than anything I have ever personally been able to put over.

The nearest approach to it that has come to my attention was accomplished and put into effect by Mr. J. E. Otterson, our past president, in reorganizing the Winchester Repeating Arms Company, during the war; and I have no doubt that he has since carried his ideas still further. In the first place, Mr. Otterson subdivided what Mr. Taylor in a broad sense understood by planning as against execution, into:

1. *Planning* in a narrower sense; deciding on how execution of the work should be carried out.
2. *Preparation*: Physically preparing the way for the eventual execution of the work in accordance with the plans made.
3. *Scheduling*: Deciding on when the execution should be taken up and carried through on completion of the necessary preparation. After this followed:
 - a. *Production*: Execution; made possible and easy because of the planning and preparation that preceded.
 - b. *Inspection*: Final inspection, as distinguished from first or preliminary inspection.

He thus worked on the basis that every department,

¹Consulting Engineer, Philadelphia, Pa.

whether productive in the narrow sense, or administrative, exists for the purpose of turning out, in a broad sense, a certain product (accomplish certain definite results). He thus early and successfully applied the idea of distinguishing between planning and execution in accordance with his own scheme as just stated above, to the purchasing and other kindred departments¹, in which he functionalized the work to an extent that of course would not be practicable in any but a very large concern.

It should be realized, however, that a thorough analysis of the work in any department is of the greatest value, even if a department is so small that each and every one of the various functions which in a large department would be performed by a single individual or more, must be left to the same person.

I am glad that Mr. Cooke called attention to the fact that Mr. Taylor himself, at times when the opportunity presented itself, carried his ideas of analyzing and functionalizing work and duties and setting tasks much further than most of his real and fancied followers know. Thus, for instance, some men who otherwise know a good deal about his work, have no idea that Mr. Taylor was also the originator of what has come to be known as interlocking cost accounting, though he never used that term.

That he acknowledged no limits to the application of his principles is demonstrated by his assertion that:

¹(The fundamental idea of the Winchester organization seems to be that the organization as a whole, and in turn each major departmental organization, breaks down into the five functions enumerated by Mr. Barth. For illustration, the organization as a whole is divided into the following major functional departments:

1. *Planning*: Involving sale research and investigation and formulation of sales policy; selection of new products and styles; determination of distribution methods and agencies; determination of selling prices; maintenance and supervision of sales force; preparation of orders and schedule for maintenance of stock of finished goods; sales engineering and sales production statistics; standardizing of salesmen's methods and equipment, etc.

2. *Preparation*: Involving technical design of products; development of processes and specifications; designing and maintenance of machinery; development of organization systems and methods, etc.

3. *Scheduling*: Involving coordination of sales, engineering, production and financial schedules; preparation and follow-up of control schedules, etc.

4. *Production*: Involving purchase of materials; employment of labor; personnel supervision, records and welfare; determination of wage standards; maintenance of production schedules; maintenance of plant; maintenance of process and system standards, etc.

5. *Inspection*: Involving auditing, accounting, inventories, progress records, etc.

This extension of Mr. Taylor's analysis of functions, and its application to the organization in the large, is undoubtedly one of the most significant contributions to the science and the art of management in recent years. Ed.)

It is the business of a management eventually to provide everybody connected with an organization with a daily task, to see to it that he or she has the means and opportunity to perform that task, that a suitable reward is made for its accomplishment and that some sort of punishment is meted out in case of failure.

That takes in everybody from the president down to the man who sweeps the floor.

F. G. COBURN¹: Mr. Taylor brought to everybody's attention the fact that the fundamental principles of good management are applicable to any work, particularly to the management of the factory; and showed how to do it. His illustrations were all drawn from details, and many people failed to see that he was stating them as illustrations and was talking about principles and their general application. Therefore, this is a useful paper because it is well designed to bring this point to general attention.

J. WILLIAM SCHULZE: I don't want any misconceptions or misinterpretations to remain in the minds of the audience as to what I meant when I said that the two definite, concrete objectives of the business were increased profits and financial stability. At the top of the chart you will find the panel covering the broad policies of a business. These policies control the profit working functions, and I think I emphasized in the paper that it is essential that profits be controlled by broader considerations.

It is my conception, and I should like to make this clear, that it is the duty of the administrative officials so to operate their business with respect to both profits and finances as not to run counter to the more basic policies regarding the human element in their business; so as not to come into conflict with the laws of ethics and policies in which the body politic is interested.

The concrete, definite objects of running a business today, the brass tacks in which you and I who are running a business are interested, within the scope of these broader policies, is to see that the business is profitable and to see that it is in financially sound condition after the year is over. The two things are not out of harmony with each other. One comes within the other. That is the reason I put the broader policies at the top and the others at the bottom of the chart.

I should like also to say a word in answer to Mr. Drury. I agree that the natural evolutionary result of additional planning will be to reduce the field of administration and to enlarge the field of management by drawing from one to the other. At the same time, there is an element of administration which exists not only at the top of the business, looking at it from a departmental standpoint, but also within each depart-

¹Asst. to Vice President, Bethlehem Shipbuilding Corporation, Ltd., Bethlehem, Pa.

ment. Each departmental manager has an administrative function. He is a dual personality. His administrative function is part of himself, as well as is the more direct management function; and I will confess right here, so far as I am concerned, that I am not able to draw the distinction always between the two. I cannot always say where one stops and the other begins, so far as its application to daily business is concerned.

CORRESPONDENCE

I. SHALL THE TAYLOR SOCIETY ADOPT A CREED?

ON the inside back cover of the BULLETIN has been carried for the past year "A Management Engineer's Creed." That creed was prepared by the Managing Director without special authority, and its publication has been continued because only favorable comments concerning it have been received.

It has several times been suggested by members that the Society formally adopt a creed. The following communication from Henry W. Shelton, in fact, places the suggestion squarely before the membership.

Enclosed is tentative draft of statement of the "Position of the Taylor Society in Relation to Industry." As far as I know, no engineering society has taken a definite stand toward present day industrial problems and I believe the Taylor Society would do well to be the first to come out of the woods and declare itself. If you agree with me perhaps you will think it worth while to present this to the Board of Directors to be later submitted, if they approve, to the membership for vote.

This statement is the outgrowth of a revision I made a short time ago of the statement of the American Association of Engineers on "Trade Unionism in the Profession" issued November 17, 1919. Of course I do not imply that it is a perfect product. I have no doubt that you could suggest important changes for the better, any of which will be most welcome.

Sincerely yours,

HENRY W. SHELTON

The enclosure referred to reads as follows:

POSITION OF THE TAYLOR SOCIETY IN RELATION TO INDUSTRY

Foreword: The American people, in common with the rest of the world, has entered a period of readjustment of its industrial ideals and practice following the World War. As a participant in this readjustment, the Taylor Society, (A Society to Promote the Science and the Art of Administration and of Management) desires to make a statement of its position in relation to industry.

The Engineer and the Manager: The engineer and the manager are servants of mankind. Through technical training and experience in the control of the forces of nature they acquire unique power.

Our Purpose: To promote the righteous use of this power individually by engineers and managers, and collectively by the professions, is the aim of this Society. Our in-

But the bigger answer that I want to make to Mr. Drury is: that one of the administrative policies to be determined and put in force is the very policy of applying planning to the business as a whole; and if I can only get started consideration of the coordination of all the departments in the business, whether or not we apply the planning principle to the administrative function—the determination of the governing policies at the top—I shall be satisfied.

fluence should be constructively used for human welfare by forming sound ideals and standards, by stimulating effort and accomplishment, and by promoting efficient production and fair distribution of things men want.

Increased Production: Because all men have not yet all the things they want, and because economic betterment goes hand in hand with mental and spiritual betterment, the production and distribution of goods and services should be increased,—not limited. Restrictions on the production or distribution of things men want, whether by individuals, groups or corporations, cannot have our sanction. On the contrary, we urge upon all engaged in industry united effort in the discovery and application of the most effective methods. The day of science in industry has but dawned.

Reward According to Merit: Reward should be according to merit. By merit is meant the effectiveness with which one uses his powers in the service of his fellow-men. Men are not equal in this respect.

Method: Therefore justice requires that relative merit be measured. It also requires that the standards of measurement and their application be determined by all parties at interest,—not by one of them for another. The opportunity to improve relative standing through self-development encourages each to his best endeavor, while the collective recognition of achievement assures a just and unbegrudged reward. To promote the general recognition and application of fundamentals, we advocate organized associated effort, including responsible representation, when an aid to any group in the fulfillment of social ends.

The Goal: The liberation of the human spirit constitutes the very essence of the American tradition. Our nation was founded to promote religious and political liberty. This Society, to be worthy of its American heritage, must advocate the continuous development in industry of policies and mechanisms which will promote reasoned liberty and freedom of action both for the individual and for groups. Absolute freedom under intrinsic law—religious, political and industrial—is the goal of the race.

Responsibility: The dignity of any group, and its ability to hold the public confidence, rest on the maintenance of the highest ethical standards in service to society. As an incorporated organization, this Society is responsible for its corporate acts. It cannot, however, control the decisions or hold itself responsible for the professional acts of its individual members. If the act of a member is shown to be inconsistent with the position of the Society, the Society will both refuse to sanction the act and take such steps within its power as most effectually to make clear its position and to further its ends.

Conclusion: The Taylor Society recognizes its fundamental unity of interest with all other servants of the public good. In any controversy arising between one group and another this Society will exert its influence in behalf of whichever side it believes to be working most sincerely for the public good. Moreover, it will work unceasingly to discover and make known the truth in the light of which all controversies may be resolved.

Copies of the "Creed" were sent to Members of the Board of Directors and the following replies were received. One reads:

I think there is much good to be done by a constant reiteration of sound principles, especially those which emphasize the professional standards desirable in business and the necessity of taking the employees into account as human beings. The difficulty with Mr. Shelton's proposition lies chiefly in the fact that there seems to be something fundamentally incongruous between a general vote and a statement of principle. I suppose a statement of principle which can be voted in the affirmative by a number of people has to be so vague as to be not much good.

My suggestion would be, therefore, that we give space to this statement as coming from Mr. Shelton, invite comments from members and arrange with a dozen or so that they will make supporting and interpretative comments.

A second reads:

I have yours of the 24th relating to communication from Shelton. I think that the Society could very readily subscribe to all that he sets forth. I am not sure but that this is not pretty well covered in our Constitution. My thought is that in the form of a resolution from the Governing Board or some other form this might well appear on the first page of the Bulletin.

A third reads:

Replying to your memorandum of July 24th, 1920, relative to a letter with enclosure to you from Mr. Shelton, I see no value to the move he recommends because it has been my experience that people pay but little attention to platforms, and particularly in this case, because the platform on this subject is bound to sound like an aggregation of platitudes. It seems to me that the creed of our Society is enough.

In the Managing Director's appropriate jacket is room for letters on this proposition from all members of the Society.

II. TOP CONTROL

The following letter, written by one member of the Society to another, reminds us of the discussion in Vol. IV, No. 2, "Centralization of Administrative Authority."

My dear Mr. ———:

I have been thinking with much interest about your idea of a top control through super-organization. Is not the effectiveness of such a top control dependent on the point of view which those at the top control take toward the organization? Have they a mechanistic or an organic conception? If their conception is mechanistic, the organization which they direct will need all of its motive force from the top; it will be neither self-acting nor self-correcting. If their conception is organic, the organization will furnish it own motive power and only be guided by those at the top. It will be largely self-acting but also self-correcting. If you want self-correction, you must allow freedom and self-action.

In a mechanistic organization, the farther away from the center you go, the weaker is the control, because it is a control largely by methods and mechanisms. In an organic organization, the farther away you go from the center, the more complete may be the expression and fulfillment of the central control, because it is a control of ideas and ideals.

Is it not true that the larger and more complex the organization, the more must the top control be one of ideas and ideals rather than one of methods and mechanisms? Does not its effectiveness fall down when it tries to prescribe too definitely the mode of expression of those who are expected to carry out its principles? Does it not succeed in proportion as it clarifies its own purposes and is able to get its ideas across to those who are to carry them out in detail? Somewhere down the line, you may say, right practice must be developed. Is it not truer to say that right practice is developed *all* along down the line?

It seems to me that the organic point of view is the only sound one to take and that the weakness of the other position is the apparent tendency to lean toward the idea of a mechanistic control. On the organic basis the top control must be a clearing house, gaining impressions, and sending out impulses based on those impressions, but leaving the actual final work and method to be done largely by the local organisms. The top control is the strategical center from which will emanate the motive impulses to guide action all down the line. If the top control properly fulfills its function, the actions all down the line, however they may vary in detail, will be harmonious because acting on a common basis.

The mechanistic idea seems to me to lead to the exercise of authority based on position; the organic idea to the exercise of authority based on knowledge and fitness. Such knowledge and fitness functions fully and properly in its own sphere, no matter where it occurs in the scale of organization. The tendency and characteristics of the two kinds of authority may be contrasted in the following table:

TOP CONTROL ACCORDING TO

AUTHORITY OF POSITION	AUTHORITY OF KNOWLEDGE (FACTS)
Autocratic. Imposed from the top. Interested at least partly in maintaining its author- ity or dignity.	Democratic. Built up from the bottom. Interested only in results; therefore, willing to give up position or anything for results.
Dogmatic. Fearful of losing position.	Scientific. Fearless, having nothing to lose.
Demands particular thing to be done "my way."	Compels recognition of right principles to which right practice will con- form.
Inflexible, fearing a change for the worse.	Flexible, welcoming changes for the better.
Conservative, resting on precedent.	Progressive, eager to gain new knowledge.
Forcing "my way" makes for disloyalty and disin- tegration.	Demonstrating the right way makes for loyalty, confi- dence, and esprit de corps.
Discounts ability of the other fellow who dis- agrees.	Recognizes and seeks other points of view as a check.
Dislikes criticism.	Welcomes criticism.
Wants to go it alone.	Wants the cooperation of the bunch.
Trusts only self.	Trusts others.
Wants to be the capstone of the pyramid.	Wants to be the bottom foundation and support of the pyramid.
Corresponds to the arbit- rary action of the object- ive or unconscious mind.	Corresponds to the creative action of the subjective or subconscious mind.